(19)日本国特許庁（ＪＰ）

(12) **公開特許公報**（A）

(11)特許出願公開番号

特開平11－201355

(43)公開日　平成11年(1999) 7月30日

(51)Int.Cl.⁶　　識別記号　　ＦＩ
Ｆ１６Ｌ　37/12　　　　Ｆ１６Ｌ　37/12

審査請求　未請求　請求項の数15　ＯＬ　（全 22 頁）

(21)出願番号　特願平10－255662

(22)出願日　平成10年(1998) 9月9日

(31)優先権主張番号　特願平9－308796
(32)優先日　平9 (1997)11月11日
(33)優先権主張国　日本（ＪＰ）

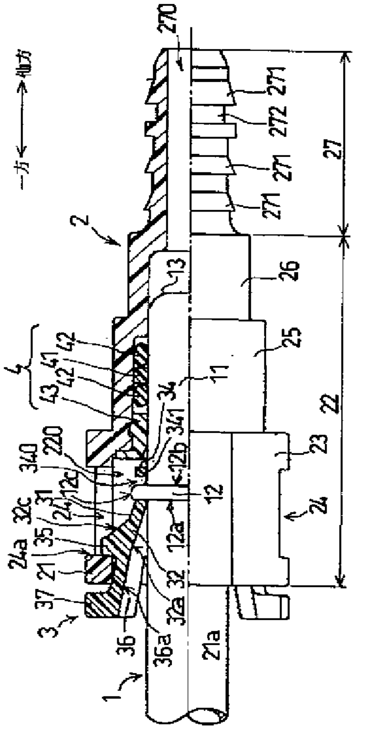
(71)出願人　000219602
東海ゴム工業株式会社
愛知県小牧市大字北外山字哥津3600番地
(72)発明者　小玉　勉
愛知県小牧市大字北外山字哥津3600番地
東海ゴム工業株式会社内
(72)発明者　伊藤　公英
愛知県小牧市大字北外山字哥津3600番地
東海ゴム工業株式会社内
(72)発明者　高柳　晃
愛知県小牧市大字北外山字哥津3600番地
東海ゴム工業株式会社内
(74)代理人　弁理士　大川　宏

(54)【発明の名称】　クイックコネクタおよびその保持部材

(57)【要約】

【課題】　再利用が容易な保持部材をもち、リリース具等の道具を使わないでも取り外しおよび分解が容易であるクイックコネクタを提供すること。

【解決手段】　保持部材３は、雄部材１のリング状突部１２と雌部材２の窓部２４の係止面２４ａとの間に介在し、雄部材１と雌部材２とを接続する。保持部材３の操作端部３７が手指で挟持されて保持部材３が縮径すると、保持部材３の第二係止部３５が雌部材２の窓部２４から内側に外れ、雄部材１および保持部材３は雌部材２から容易に引き抜かれる。保持部材３は、保持部３４の開口窓３４０に雄部材１のリング状突部１２を嵌合させて雄部材１を保持しているので、雌部材２から出しても保持部材３が雄部材１から脱落することはない。保持部材３の断面略Ｃ字形状の本体部３１を拡径させて略Ｃ字形状の開口端から雄部材１を横に取り外せば、保持部材３は変形が少なくて済み、何度でも再利用可能である。



【特許請求の範囲】

【請求項１】　先端から所定距離を隔てて設けられた遠心方向に突出するリング状突部をもつ略パイプ状の挿入端部を有する雄部材と、

軸線方向の一方に開口した挿入開口端部と、軸線方向の他方を向いて半径方向に延在する係止面をもつ第一係止部を周壁に有する収容部とを備え、前記雄部材の前記挿入端部が該挿入開口端部から該収容部に挿入される雌部材と、

少なくとも一部が前記雌部材の前記挿入開口端部から前記収容部に挿入され、前記雄部材の前記リング状突部と該雌部材の前記係止面との間に介在して、該挿入開口端部から挿入された該雄部材の前記挿入端部を該雌部材の該収容部に装着させる保持部材と、を備え、

前記保持部材は、

前記他方に向かって内周面が縮径しているテーパ壁部と、該テーパ壁部の該他方の端部に設けられた前記雄部材の前記挿入端部の前記リング状突部が嵌合して該挿入端部を保持する保持部とをもつ弾性変形により拡径および縮径が可能な断面略Ｃ字形状の本体部と、

前記本体部の前記一方の端部から遠心方向に突出して該本体部と一体的に形成された凸部であり、前記第一係止部と係合する第二係止部と、

前記本体部の前記一方の端部から該一方に突出し、前記雌部材の前記収容部への挿置時にも前記挿入開口端部から突出する操作端部をもち、該本体部の縮径時に該本体部の弾性力により遠心方向へ付勢される互いに背向した複数の操作アーム部と、を有していることを特徴とするクイックコネクタ。

【請求項２】　前記保持部材の前記本体部の外側面は、前記第二係止部から前記他方に進むにつれ軸線に近づく傾斜面をもつ請求項１記載のクイックコネクタ。

【請求項３】　前記第一係止部は、互いに対向して前記収容部の前記周壁に開口した一対の窓部であり、

前記第一係止部の前記係止面は、前記窓部の開口内面の一部である請求項１記載のクイックコネクタ。

【請求項４】　前記保持部材の前記保持部は、前記雄部材の前記リング状突部の一部が嵌合する開口窓を有する請求項１記載のクイックコネクタ。

【請求項５】　前記雌部材の前記収容部は、前記保持部材の前記開口窓を外側から見通せる位置に開口した窓部を周壁に有する請求項４記載のクイックコネクタ。

【請求項６】　前記保持部材の前記本体部は、周方向に互いに隣り合う前記保持部の間に、前記他方から形成された欠損部を有する請求項１記載のクイックコネクタ。

【請求項７】　前記雌部材は、前記収容部の内周壁から求心方向に所定厚さだけ突出して該収容部に前記保持部材が挿入される際に前記保持部材の前記欠損部に嵌合可能な嵌合凸部を有する請求項６記載のクイックコネクタ。

【請求項８】　前記雌部材は、前記挿入開口端部のうち前記第一係止部と周方向に異なる位置に、求心方向へ所定の厚さで突出した規制突部を有し、

前記規制突部は、前記雄部材に取り付けられた前記保持部材が適正な回転角度位置にない場合には、該保持部材の前記第二係止部と当接して該保持部材が前記雌部材の前記収容部内に挿入されることを阻止する突部である請求項１記載のクイックコネクタ。

【請求項９】　前記保持部材は、前記第二係止部の前記他方に軸線方向と直交して形成された規制平面を有し、

前記規制平面は、前記雄部材に取り付けられた前記保持部材が適正な回転角度位置にない場合には、前記雌部材の前記規制突部の端面に当接して該保持部材が前記雌部材の前記収容部内に挿入されることを阻止する平面である請求項８記載のクイックコネクタ。

【請求項１０】　前記雌部材は、前記挿入開口端部のうち各前記第一係止部に対応する部分に、該挿入開口端部の端面から前記収容部の内周壁へと続く面取り状の案内テーパ面を有する請求項１記載のクイックコネクタ。

【請求項１１】　前記雌部材は、各前記案内テーパ面の両端に、前記挿入開口端部の端面から各該案内テーパ面へと続く一対の案内斜面を有する請求項１０記載のクイックコネクタ。

【請求項１２】　前記雌部材の収容部は、前記雄部材の前記リング状突部と前記保持部材の本体部および第二係止部とを収容する大径部と、該大径部よりも内径が小さく内周面と該雄部材の前記挿入端部の外周面とに当接するリング状のシール部材を保持する中径部と、該中径部よりもさらに内径が小さく該雄部材の前記先端を収容する小径部とをもつ請求項１記載のクイックコネクタ。

【請求項１３】　前記雌部材の前記収容部は、周壁に開口した窓部を有し、

前記雌部材の前記収容部の外周側から該収容部に装着され弾性変形により拡径可能なＣ字形状部と、該Ｃ字形状部の両端部から半径方向内方に突出し前記保持部材の前記保持部の各前記開口窓に該収容部の各前記窓部からそれぞれ挿入された一対の係止突起部とを有する確認部材を備え、

前記確認部材は、前記雄部材と前記雌部材との結合が完了した時に、前記保持部材の前記開口窓を介して前記雄部材の前記リング状突部の外周面によって各前記係止突起部が遠心方向に押し出され、前記Ｃ字形状部が拡径される請求項４記載のクイックコネクタ。

【請求項１４】　軸線方向の一方に開口した挿入開口端部と、軸線方向の他方を向いて半径方向に延在する係止面をもつ第一係止部を周壁に有する収容部とを備え、雄部材の先端から所定距離を隔てて設けられた遠心方向に突出するリング状突部をもつ略パイプ状の挿入端部が、該挿入開口端部から該収容部に挿入される雌部材と、

少なくとも一部が前記雌部材の前記挿入開口端部から前

記収容部に挿入され、前記雄部材の前記リング状突部と該雌部材の前記係止面との間に介在して、該挿入開口端部から挿入された該雄部材の前記挿入端部を該雌部材の該収容部に装着させる保持部材と、を備え、

前記保持部材は、

前記他方に向かって内周面が縮径しているテーパ壁部と、該テーパ壁部の該他方の端部に設けられた前記雄部材の前記挿入端部の前記リング状突部が嵌合して該挿入端部を保持する保持部とをもつ弾性変形により拡径および縮径が可能な断面略Ｃ字形状の本体部と、

前記本体部の前記一方の端部から遠心方向に突出して該本体部と一体的に形成された凸部であり、前記第一係止部と係合する第二係止部と、

前記本体部の前記一方の端部から該一方に突出し、前記雌部材の前記収容部への挿置時にも前記挿入開口端部から突出する操作端部をもち、該本体部の縮径時に該本体部の弾性力により遠心方向へ付勢される互いに背向した一対の操作アーム部と、を有していることを特徴とするクイックコネクタ。

【請求項１５】　少なくとも一部が、軸線方向の一方に開口した雌部材の挿入開口端部から、軸線方向の他方を向いて半径方向に延在する係止面をもつ第一係止部を周壁に有する該雌部材の収容部に挿入され、該雌部材の該収容部に挿置された雄部材の略パイプ状の挿入端部の中間部に設けられた遠心方向に突出するリング状突部と、該雌部材の該係止面との間に介在して、該挿入開口端部から挿入された該雄部材の前記挿入端部を該雌部材の該収容部に装着させるクイックコネクタの保持部材であって、

前記保持部材は、

前記他方に向かって内周面が縮径しているテーパ壁部と、該テーパ壁部の該他方の端部に設けられた前記雄部材の前記挿入端部の前記リング状突部が嵌合して該挿入端部を保持する保持部とをもつ弾性変形により拡径および縮径が可能な断面略Ｃ字形状の本体部と、

前記本体部の前記一方の端部から遠心方向に突出して該本体部と一体的に形成された凸部であり、前記第一係止部と係合する第二係止部と、

前記本体部の前記一方の端部から該一方に突出し、前記雌部材の前記収容部への挿置時にも前記挿入開口端部から突出する操作端部をもち、該本体部の縮径時に該本体部の弾性力により遠心方向へ付勢される互いに背向した一対の操作アーム部と、を有していることを特徴とするクイックコネクタの保持部材。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、各種流体を移送するホースやパイプ等を連結するために互いに接続される雄部材および雌部材を有する配管用のクイックコネクタに関し、配管接続技術の技術分野に属する。

【０００２】

【従来の技術】（第一タイプ）従来、第一タイプのクイックコネクタとして、米国特許第４，６０１，４９７号には、図２５～図２７に示すように、雄部材７２と雌部材７７と保持部材７８とを備えたものが開示されている。

【０００３】すなわち、雄部材７２は、先端から所定の距離隔てた位置に遠心方向に突出するリング状突部７０が設けられた挿入端部７１をもつ筒状の部材である。一方、雌部材７７は、略円筒状のハウジング７６を軸線方向一端側に備えている。ハウジング７６は、雄部材７２の挿入端部７１が挿入される挿入開口端部７３と、挿入開口端部７３の軸線方向内方に設けられた収容部７４と、収容部７４に設けられた第一係止部７５とを有する。保持部材７８は、雌部材７７の挿入開口端部７３から挿入されて収容部７４に収納され、挿入開口端部７３から挿入された雄部材７２と雌部材７７とを結合させる部材である。

【０００４】保持部材７８は、雄部材７２の挿入端部７１の外径と略同等の内径を有する環状カラー部７９と、環状カラー部７９から軸線方向に一体的に延設された３本の脚部８０とから構成されている。各脚部８０は、雌部材７７の収容部７４内で半径方向内外方に弾性変形可能である。そして、各脚部８０は、雌部材７７の挿入開口端部７３から挿入された雄部材７２のリング状突部７０に係止可能な係止凹部８１を、内面側に有する。また、各脚部８０は、雌部材７７の第一係止部７５に係止可能な第二係止部８２を、外面側に有している。

【０００５】したがって、この第一タイプのクイックコネクタは、次の手順により接続される。先ず、雄部材７２のリング状突部７０で保持部材７８の各脚部８０を半径方向外方に弾性変形させつつ、雄部材７２を保持部材７８に挿入させる。すると、雄部材７２のリング状突部７０が保持部材７８の係止凹部８１に嵌合して係止されれる。次に、雄部材７２を保持した保持部材７８を雌部材７７に挿入すると、雌部材７７の第一係止部７５に保持部材７８の第二係止部８２が嵌合して係止される。このように、雄部材７２と雌部材７７との間に保持部材７８が介在することにより、雄部材７２と雌部材７７とは互いに接続される。

【０００６】（第二タイプ）また、特開平７－７１６７３号公報には、前記第一タイプのクイックコネクタに係る保持部材７８とは構成及び作用が異なり、断面略Ｃ字形状の保持部材を備えた第二タイプのクイックコネクタが開示されている。すなわち、第二タイプのクイックコネクタは、図２８に示すように、雄部材７２と雌部材７７と保持部材９０とＯリング等のシール部材類とからなる。さらに保持部材９０は、図２９に示すように、本体部９２と第二係止部９３と操作アーム部９４とからなる。

【０００７】以下、保持部材９０の構成についてより詳細に説明する。本体部９２は、雌部材７７の収容部７４内で弾性変形により拡径可能で軸線方向一端（図２８の左側）から他端側（図２８の右側）に向かうに連れて小径となるようにテーパ状とされたＣリング状のテーパ壁部よりなる。保持部材９０はさらに、雄部材７２と雌部材７７との結合時に雄部材７２のリング状突部７０と係止して前記軸線方向一端側への雄部材７２の抜けを規制する当接部９１を、本体部９２の径の小さい他端側にもつ。第二係止部９３は、本体部９２の径の大きい一端側外周面に一体的に形成され、雌部材７７の第一係止部７５に係止する凸部である。操作アーム部９４は、本体部９２の径の大きい一端側端面に設けられ、本体部９２の径の大きい一端側をその径を小さくすることにより第一係止部７５と第二係止部９３との係止を解く操作部である。

【０００８】したがって、この第二タイプのクイックコネクタは、次の手順によって接続される。先ず、雄部材７２のリング状突部７０で保持部材９０の本体部９２が弾性変形により拡径させられつつ、雄部材７２が保持部材９０に挿入される。これにより、雄部材７２のリング状突部７０と保持部材９０の当接部９１とが当接する。次に、保持部材９０を押すことによって、雄部材７２の操作端部７１と保持部材９０とを雌部材７７に挿入する。すると、雌部材７７の第一係止部７５が保持部材９０の第二係止部９３に嵌合し、保持部材９０は雌部材７７に係止される。すなわち、雄部材７２のリング状突部７２と雌部材７７の第一係止部７５との間に保持部材９０が介在することにより、雄部材７２は雌部材7から抜けなくなる。こうして、雄部材７２と雌部材７７とは保持部材９０によって互いに接続されるに至る。

【０００９】

【発明が解決しようとする課題】（第一タイプ）ところで、前記従来の第一タイプのクイックコネクタにおいて、雄部材７２と雌部材７７とを分離する場合には、保持部材７８の各脚部８０を半径方向内方に弾性変形させて、雌部材７７の第一止部７５と保持部材７８の第二係止部８２との係止を解除する。そして、この状態で、保持部材７８とともに雄部材７２を雌部材７７から軸線方向に引き抜くことにより、雄部材７２と雌部材７７とを分離することができる。

【００１０】このように雄部材７２と雌部材７７とを分離した後においては、保持部材７８の環状カラー部７９に雄部材７２の挿入端部７１が挿入されている。また、保持部材７８の係止凹部８１に雄部材７２のリング状突部７０が嵌合しているので、保持部材７８が雄部材７２を保持している。しかしながら、このように雄部材７２に保持された保持部材７８を雄部材７２から外す場合、このままの状態では保持部材７８を雄部材７２から軸線方向又は軸直角方向に引き抜くことができない。それゆえ、保持部材７８の各脚部８０を半径方向外方に大きく反り返るように変形させて保持部材７８の係止凹部８１と雄部材７２のリング状突部７０との係止を解除した後、保持部材７８を雄部材７１から軸線方向に引き抜かなければならない。このため、保持部材７８の脚部８０が大変形に伴い損傷等することがあり、保持部材７８の取り外しが容易でないばかりではなく、保持部材７８の再利用が困難であった。

【００１１】なお、雄部材７２と雌部材７７との分離後、別途用意したリリース具を各脚部８０の内側に挿入して、各脚部８０を半径方向外方に弾性変形させることにより、係止凹部８１とリング状突部７０との係止を解除することができる。こうすれば、脚部８０の大変形を伴うことなく、保持部材７８を雄部材７２から軸線方向に引き抜くことが可能である。このリリース具は、内径が雄部材７２外径よりやや大きく外径はリング状突部７０の外径とおおむね等しい円筒を先端にもつ特殊工具である。しかし、実際の現場でこのようなリリース具を用意しておくことは面倒であるばかりではなく、配管等に接続された雄部材７１をリリース具に挿入することが困難である場合が少なくない。それゆえ、リリース具を使ったとしても、保持部材７８を雄部材７２から取り外すのは容易であるとは言い難い。

【００１２】すなわち、このような第一タイプのクイックコネクタでは、保持部材７８の取り外しが容易でないばかりではなく、保持部材７８の再利用が困難であった。

（第二タイプ）一方、前記従来の第二タイプのクイックコネクタにおいて、雄部材７２と雌部材７７とを分離するには、次の手順で行われる。先ず、保持部材９０の操作アーム部９４を押圧して、本体部９２の径の大きい一端側をその径を小さくすることにより、第二係止部９３と雌部材７７の第一係止部７５との係止を解除する。この状態で、保持部材９０ととともに雄部材７２を雌部材７７から軸線方向に沿って引き抜くことにより、保持部材９０ごと雄部材７２と雌部材７７とを分離することができる。

【００１３】しかしながら、雄部材７２と雌部材７７とを分離した後において、保持部材９０は、雄部材７２に対して挿入端部７１の先端とは反対側への抜けが何等規制されていない。このため、雌部材７７から雄部材７２とともに引き抜いた保持部材９０が、雄部材７２に対して、挿入端部７１の先端とは反対側へ大きくずれてしまい、その後の作業性を低下させる問題があった。

【００１４】また、前述のように、クイックコネクタを分離するために雄部材７２を雌部材７７から引き抜いてしまうと、雄部材７２に保持部材９０が係止されていない。それゆえ、保持部材９０が雄部材７７に沿って滑り落ち、保持部材９０を紛失してしまう可能性があった。このようなことは、保持部材９０の再利用を困難にする

ばかりではなく、異物の存在が問題となる現場では厳に防止すべきことであるから、このような第二タイプのクイックコネクタの取り外しには細心の注意が必要とされた。

【００１５】（本発明の課題）そこで本発明は、再利用が容易な保持部材をもち、リリース具等の道具を使わないでも取り外しおよび分解が容易であるクイックコネクタを提供することを、解決すべき課題とする。

【００１６】

【課題を解決するための手段】（構成）本発明のクイックコネクタは、先端から所定距離を隔てて設けられた遠心方向に突出するリング状突部をもつ略パイプ状の挿入端部を有する雄部材と、軸線方向の一方に開口した挿入開口端部と、軸線方向の他方を向いて半径方向に延在する係止面をもつ第一係止部を周壁に有する収容部とを備え、前記雄部材の前記挿入端部が該挿入開口端部から該収容部に挿入される雌部材と、少なくとも一部が前記雌部材の前記挿入開口端部から前記収容部に挿入され、前記雄部材の前記リング状突部と該雌部材の前記係止面との間に介在して、該挿入開口端部から挿入された該雄部材の前記挿入端部を該雌部材の該収容部に装着させる保持部材と、を備え、前記保持部材は、前記他方に向かって内周面が縮径しているテーパ壁部と、該テーパ壁部の該他方の端部に設けられた前記雄部材の前記挿入端部の前記リング状突部が嵌合して該挿入端部を保持する保持部とをもつ弾性変形により拡径および縮径が可能な断面略Ｃ字形状の本体部と、前記本体部の前記一方の端部から遠心方向に突出して該本体部と一体的に形成された凸部であり、前記第一係止部と係合する第二係止部と、前記本体部の前記一方の端部から該一方に突出し、前記雌部材の前記収容部への挿置時にも前記挿入開口端部から突出する操作端部をもち、該本体部の縮径時に該本体部の弾性力により遠心方向へ付勢される互いに背向した複数の操作アーム部と、を有していることを特徴とする。

【００１７】なお、雄部材なしで工場から出荷される場合が多いので、雌部材と保持部材とを有するだけでも本発明のクイックコネクタであるとする。このクイックコネクタは、組立現場において雄部材が挿入されて配管類の接続機能を果たす。また、前述のクイックコネクタに使用される保持部材は、非常に特徴に富んだものであるので、クイックコネクタの保持部材も本発明品であるとする。

【００１８】（作用効果）本発明のクイックコネクタには、接続と取り外しとの二通りの作用がある。先ず、本発明のクイックコネクタの接続は、次のように二通りの手順のうちいずれによっても行うことができる。第一の接続手順は、雄部材の挿入端部が保持部材によって保持され雄部材と保持部材とが組み立てられた状態で、雄部材の挿入端部を保持部材ごと雌部材の収容部に挿入し、雌部材の第一係止部に保持部材の第二係止部を係合させる手順である。

【００１９】本手順では先ず、雄部材の挿入端部を保持部材に保持させる際には、保持部材の一方の端部からおおよそ軸線を合わせて雄部材が先端から挿入される。すると、雄部材の挿入端部に設けられたリング状突部が、外周面で保持部材のテーパ壁部の内周面に当接し、保持部材の断面略Ｃ字形状の本体部を押し拡げつつ本体部の他方へと挿入されていく。さらに雄部材が保持部材に深く挿入され、雄部材のリング状突部が保持部材の保持部に達すると、自然にリング状突部が保持部に嵌合し、雄部材の挿入端部は保持部材の本体部に保持されて雄部材と保持部材とが組み立てられる。

【００２０】しかる後、雌部材の第一係止部と保持部材の第二係止部との周方向の位置が合わせられて、雄部材の挿入端部が保持部材と一緒に雌部材の収容部に挿入され、所定の挿入深さに達すると、第一係止部と第二係止部とが互いに係合する。その結果、雄部材のリング状突部と雌部材の第一係止部の係止面との間に保持部材の本体部および第二係止部が介在して、雄部材は雌部材から抜けなくなり、雄部材と雌部材との接続が完了する。

【００２１】第二の接続手順は、雌部材の収容部に保持部材を挿入し、雌部材の第一係止部に保持部材の第二係止部を係合させて雌部材の収容部に保持部材を保持させ、しかる後、雄部材の挿入端部を雌部材の収容部および保持部材に挿入する手順である。本手順では先ず、雌部材の第一係止部と保持部材の第二係止部との周方向の位置が合わせられて保持部材が雌部材の収容部に挿入され、所定の挿入深さに達すると、第一係止部と第二係止部とが互いに係合する。その結果、保持部材は雌部材の収容部から抜け落ちることなく、保持部材は雌部材の収容部に保持される。ここで、保持部材の操作アーム部の操作端部は、雌部材の挿入開口端部から一方に突出した状態に保たれている。また、保持部材が雌部材の内部にさらに深く挿入されることがないように、保持部材は雌部材の収容部に保持されている。

【００２２】しかる後、おおよそ軸線を合わせて雌部材および保持部材の一方の端部から雄部材が先端から挿入される。すると、雄部材の挿入端部に設けられたリング状突部が、外周面で保持部材のテーパ壁部の内周面に当接し、保持部材の断面略Ｃ字形状の本体部を押し拡げつつ本体部の他方へと挿入されていく。さらに雄部材が保持部材に深く挿入され、雄部材のリング状突部が保持部材の保持部に達すると、自然にリング状突部が保持部に嵌合し、雄部材の挿入端部は保持部材の本体部に保持される。すると、雄部材のリング状突部と雌部材の第一係止部の係止面との間に保持部材の本体部および第二係止部が介在するに至り、雄部材は雌部材から抜けなくなって雄部材と雌部材との接続が完了する。

【００２３】それゆえ、本発明のクイックコネクタの接続は極めて容易である。また、接続前に保持部材が雌部

材または雄部材に保持されているので、保持部材を作業現場で取り落とすことが防止されている。そればかりではなく、雄部材および雌部材のうち一方が固定されていれば、クイックコネクタの接続手順を片手でこなすことも可能である。

【００２４】一方、本発明のクイックコネクタの取り外しおよび分解は、次のようにして行われる。すなわち、本発明のクイックコネクタでは、保持部材が、テーパ壁部および保持部をもち弾性変形可能な断面略Ｃ字形状の本体部と、雌部材の第一係止部と係合する凸部である第二係止部と、雌部材から操作端部が突出している操作アーム部とを持つ。ここで操作アーム部は、本体部の弾性力により外側へ付勢されているので、雌部材の収容部へ挿入された状態でも、雄部材の外周面から離れており、これに伴って本体部のテーパ壁部も雄部材の外周面から離れている。それゆえ、操作アーム部の操作端部を指先等で求心方向へ押し縮めれば、本体部のテーパ壁部も求心方向へ縮径する。テーパ壁部の縮径に伴い、第二係止部が雌部材の第一係止部から求心方向へ外れるので、雄部材を引っ張れば雌部材から雄部材および保持部材を取り外すことができる。

【００２５】その際、保持部材の保持部には雄部材のリング状突部が嵌合しているので、保持部材は雄部材の挿入端部に係合して雄部材と一体に組み立てられた状態を保っている。それゆえ、雄部材および保持部材を雌部材から引き抜いても、不用意に保持部材が雄部材から脱落することがない。雄部材と保持部材とを分解して雄部材から保持部材を取り外すには、断面略Ｃ字形状の本体部の開口から雄部材の挿入端部が出るように、保持部材を軸直角方向外方に引っ張れば良い。その際、断面略Ｃ字形状の本体部の開口を雄部材のリング状突部が通過できる分だけ、保持部材の本体部が拡径してＣ字形状の断面が拡がるだけで済み、保持部材の大変形は避けられる。それゆえ、雄部材からの保持部材の取り外しは容易であり、かつ、雄部材から保持部材を取り外す際にも、保持部材が大変形によって破損するような不都合は防止されている。また、雄部材が固定されている場合はもちろんのこと、そうでない場合にも、作業員が片手で雄部材から保持部材を取り外すことができ、保持部材の雄部材からの取り外しがきわめて容易である。

【００２６】したがって、本発明のクイックコネクタによれば、保持部材の再利用が容易であるばかりではなく、リリース具等の道具を使わないでも取り外しおよび分解が容易であるという効果がある。

【００２７】

【発明の実施の形態】以上の本発明のクイックコネクタにおいて、保持部材は、適正な弾性をもって変形可能な樹脂等で一体成形部材として形成することができる。保持部材の保持部は、内側に向かって開口し雄部材のリング状突部が嵌合する溝をもつ部分であっても良いし、内側面から外側面へ貫通し雄部材のリング状突部が嵌合する開口窓をもつ部分であっても良い。このような溝または開口窓は、雄部材のリング状突部に対して軸線方向にぴったり嵌合している必要はなく、大幅な緩み嵌めであっても構わない。一方、このような溝または開口窓は、雄部材のリング状突部に対して半径方向にはぴったりと嵌合していることが望ましいが、必ずしもその必要はなく、緩み嵌めであっても構わない。

【００２８】また、保持部材の操作アーム部は、クイックコネクタが接続された状態でも雌部材の挿入開口端部から突出する操作端部をもつが、操作端部は遠心方向に突出して形成されていると良い。こうすると、クイックコネクタを取り外す際に、作業員が指先等で操作端部を摘んで保持部材を縮径させ易くなり、作業性が向上する。なお、保持部材の操作アーム部は、互いに背向した一対が備わっていることが、操作上最も好ましい。なぜならば、操作アーム部が一対であれば、作業員が親指と人差し指で操作アーム部の先端部をつかむだけで、クイックコネクタを取り外すことができるからである。

【００２９】また、雌部材は、比較的剛性の高い材料であれば樹脂や鋳造金属等から一体成形部材として形成することができる。雌部材の係止面をもった第一係止部は、収容部の内周面に形成された係止面としての垂直面をもつ溝であっても良いし、あるいは収容部の周壁を貫通し係止面としての開口内面をもつ窓部であってもよい。なお、雌部材の収容部には、雄部材の略円筒状の挿入端部との間で水密性や気密性を確保するために、Ｏリング等のシール部材が保持されていると良い。また、雄部材が必要以上に雌部材に挿入されないようにするために、雌部材は、保持部材の保持部の他方の端面が当接する当接面をもつか、同当接面をもったカラー部材等をもっているとなお良い。こうすれば、雄部材のリング状突部の他方の端面と雌部材との間に、保持部材の保持部の一部が挟持されるので、雄部材の挿入深さが適正な範囲に確実に規制される。

【００３０】なお、雄部材は、使用目的に十分な剛性強度、化学的安定性および耐熱性をもった材料であれば、ステンレス鋼等の金属材料から形成されていても良いし、樹脂等の非金属材料から形成されていても良い。以上の本発明のクイックコネクタは、次のような構成の形態で実施されることが好ましい。

【００３１】先ず、前記保持部材の前記本体部の外側面は、前記第二係止部から前記他方に進むにつれ軸線に近づく傾斜面をもつとよい。逆に言えば、この傾斜面は、保持部材の保持部の一方から第二係止部に至るまで徐々に外側へ拡がっていく外側面である。この傾斜面と第二係止部との間には、段差があっても良いしなくても良い。本構成では、雌部材の収容部に保持部材を挿入する際に、保持部材の傾斜面が雌部材の挿入開口端部の内周端部に当接し、保持部材が雌部材に挿入されるにつれて

保持部材の本体部が縮径される。それゆえ、本構成によれば、雌部材の収容部に保持部材を挿入する作業がスムースに行われるようになるという効果がある。

【0032】また、前記第一係止部は、互いに対向して前記収容部の前記周壁に開口した一対の窓部であり、前記第一係止部の前記係止面は、前記窓部の開口内面の一部であると良い。本構成では、雌部材の収容部に保持部材が挿入されて保持部材の第二係止部が雌部材の第一係止部に係合する様子が、雌部材の窓部を通して外側から見えるので、第一係止部と第二係止部との係合を目視確認することができる。したがって本構成によれば、雌部材と保持部材との係合が確実に確認されるので、保持部材の雌部材への挿入が浅かったり周方向の位置が適正でなかったりして保持部材と雌部材との係合が不完全になるような不都合が防止される。すなわち、保持部材がより確実に雌部材の収容部に装着され、クイックコネクタの接続がより確実になるという効果がある。

【0033】また、前記保持部材の前記保持部は、前記雄部材の前記リング状突部の一部が嵌合する開口窓を有すると良い。本構成では、保持部材を雄部材に組み付ける際に、保持部材の保持部に雄部材のリング状突部が嵌合したことを目視確認することができる。それゆえ本構成によれば、保持部材の保持部が雄部材の挿入端部を確実に保持した状態で保持部材および挿入端部を雌部材に挿入することができるので、クイックコネクタの接続がより確実になるという効果がある。

【0034】ここでさらに、前記雌部材の前記収容部は、前記保持部材の前記開口窓を外側から見通せる位置に開口した窓部を周壁に有するとなお良い。本構成では、保持部材の開口窓に雄部材のリング状突部が嵌合した状態で雄部材の挿入端部と保持部材とが雌部材の収容部に挿入されていることを、収容部の窓部を通して目視確認することができる。それゆえ本構成によれば、前述の接続手順のうちいずれによってクイックコネクタを接続しても、クイックコネクタの接続がよりいっそう確実になるという効果がある。

【0035】また、前記保持部材の前記本体部は、周方向に互いに隣り合う前記保持部の間に、前記他方から形成された欠損部を有すると良い。本構成では、断面略C字形状の保持部材の周方向の途中に欠損部が形成されているので、保持部材の本体部の剛性が低下して保持部材の変形が容易になる。すなわち、保持部材を雄部材に取り付けたり取り外したりする際や、保持部材に保持された雄部材の挿入端部を雌部材の収容部に挿入したり逆に引き抜いたりする際に、保持部材が容易に変形する。なお、保持部材の変形には、本体部の縮径や拡径だけではなく、回転対称でない曲げ変形も含まれるが、保持部材に欠損部があると特にこの曲げ変形が容易になる。それゆえ本構成によれば、クイックコネクタの組立および接続と取り外しおよび分解との各作業に必要な力が少なくなり、各作業がいっそう容易になるという効果がある。

【0036】ここでさらに、前記雌部材は、前記収容部の内周壁から求心方向に所定厚さだけ突出して該収容部に前記保持部材が挿入される際に前記保持部材の前記欠損部に嵌合可能な嵌合凸部を有すると良い。本構成では、嵌合凸部が収容部の内周壁から突出しているので、保持部材の欠損部またはC字形断面開口部のうちいずれかに嵌合凸部が嵌合しないと、雄部材を保持した保持部材は雌部材の収容部に十分に深く挿入されることがない。すなわち、雌部材の収容部のうち適正な位置に嵌合凸部が形成されていれば、雄部材を保持した保持部材は適正でない回転角度位置では雌部材に十分に深く挿入されない。その結果、保持部材の回転角度位置が不適正であることが作業員に容易に分かり、適正な回転角度位置へと保持部材が回転させられる。それゆえ本構成によれば、不適正な回転角度位置での保持部材の雌部材への挿入が防止され、クイックコネクタの接続がよりいっそう確実になるという効果がある。

【0037】また、前記雌部材は、前記挿入開口端部のうち前記第一係止部と周方向に異なる位置に、求心方向へ所定の厚さで突出した規制突部を有すると良い。ここで、前記規制突部は、前記雄部材に取り付けられた前記保持部材が適正な回転角度位置にない場合には、該保持部材の前記第二係止部と当接して該保持部材が前記雌部材の前記収容部内に挿入されることを阻止する突部である。本構成では、雄部材を保持した保持部材が雌部材の挿入開口端部に挿入される際に、保持部材が適正な回転角度位置にない場合には、保持部材の外側に突出した第二係止部が雌部材の規制突部よりも内側に入り込むことができない。すると、作業員が雄部材を雌部材に押し込もうとしても、保持部材が第二係止部が雌部材の挿入開口端部に入り込まず、明らかに不十分な深さにまでしか雄部材および保持部材を雌部材に挿入することができない。その結果、保持部材の回転角度位置が雌部材に対して適正でないことが明らかになるので、作業員は保持部材を周方向に回転させて適正な回転角度位置にせざるを得ない。それゆえ本構成によっても、不適正な回転角度位置で保持部材が雌部材へ挿入されなくなり、クイックコネクタの接続がより確実になるという効果がある。

【0038】ここでさらに、前記保持部材は、前記第二係止部の前記他方に軸線方向と直交して形成された規制平面を有すると良い。ここで、前記規制平面は、前記雄部材に取り付けられた前記保持部材が適正な回転角度位置にない場合には、前記雌部材の前記規制突部の端面に当接して該保持部材が前記雌部材の前記収容部内に挿入されることを阻止する平面である。本構成では、雄部材を保持した保持部材が雌部材の挿入開口端部に挿入される際に、保持部材が適正な回転角度位置にない場合には、保持部材の外側に突出した第二係止部の規制平面が雌部材の規制突部の端面に当接する。すると、作業員が

雄部材を雌部材に押し込もうとしても、保持部材が第二係止部が雌部材の挿入開口端部に入り込まず、保持部材の第二係止部が露出した深さにまでしか、雄部材および保持部材を雌部材に挿入することができない。その結果、保持部材の回転角度位置が雌部材に対して適正でないことが明白であるので、作業員は保持部材を周方向に回転させて適正な回転角度位置にせざるを得ない。それゆえ本構成によってもまた、不適正な回転角度位置で保持部材が雌部材へ挿入されなくなり、クイックコネクタの接続がより確実になるという効果がある。

【００３９】また、前記雌部材は、前記挿入開口端部のうち各前記第一係止部に対応する部分に、該挿入開口端部の端面から前記収容部の内周壁へと続く面取り状の案内テーパ面を有すると良い。本構成では、前述の構成とは逆に、保持部材の第二係止部が雌部材の第一係止部に対応する周方向の位置にきた場合には、保持部材の第二係止部の凸部が雌部材の挿入開口端部に形成された案内テーパ面に摺接する。すなわち、保持部材の第二係止部は、雌部材の案内テーパ面に摺接して案内され、求心方向に押圧を受けて変位しながらスムースに雌部材の収容部に挿入されて雌部材の第一係止部と係合するに至る。このような挿入をスムースにする作用は、保持部材の回転角度位置が雌部材に対して適正である場合にのみ発揮される。それゆえ本構成によれば、適正な回転角度位置で保持部材が雌部材へ挿入され易くなり、クイックコネクタの接続がより確実になるという効果がある。

【００４０】ここでさらに、前記雌部材は、各前記案内テーパ面の両端に、前記挿入開口端部の端面から各該案内テーパ面へと続く一対の案内斜面を有すると良い。本構成では、保持部材の第二係止部が適正な回転角度位置から少しずれている程度であれば、保持部材の第二係止部の角部が雌部材の案内斜面に摺接しながら、保持部材が雌部材に挿入される。すなわち、保持部材の第二係止部が雌部材の案内斜面に摺接し、保持部材が雌部材に挿入されるにつれて保持部材はより適正な回転角度位置へと自然に回転させられる。その結果、保持部材の第二係止部が雌部材の収容部に挿入されるまでに、保持部材は雌部材に対して適正な回転角度位置に回転し終え、保持部材の第二係止部は雌部材の第一係止部に適正に係合するに至る。それゆえ本構成によれば、クイックコネクタの接続がより容易になるという効果がある。

【００４１】なお、本構成は、雌部材の前述の規制突部が周方向に所定の幅で延在しており、規制突部が挿入開口端部の端面から突出した同端面と平行な規制端面をもつ場合には、少しの工夫を加えることによりいっそう効果的になる。すなわち、同規制端面から前記案内テーパ面に至るまで連続して案内斜面が形成されていれば、クイックコネクタの接続がよりいっそう容易になる。なぜならば、雄部材を保持した保持部材が雌部材に対して不適正な回転角度位置にある場合には、作業員が保持部材を少し周方向に回転させて、雌部材の規制突部とその規制端面から保持部材の第二係止部を少しずらしてやるだけでよい。そうすれば、保持部材が挿入されるにつれて保持部材は雌部材の案内斜面に案内されて正規の回転角度位置に自然に収まり、保持部材の第二係止部が雌部材の第一係止部に係合するに至るからである。

【００４２】また、前記雌部材の収容部は、前記雄部材の前記リング状突部と前記保持部材の本体部および第二係止部とを収容する大径部と、該大径部よりも内径が小さく内周面と該雄部材の前記挿入端部の外周面とに当接するリング状のシール部材を保持する中径部と、該中径部よりもさらに内径が小さく該雄部材の前記先端を収容する小径部とをもつとよい。本構成では、雄部材の先端が雌部材の小径部に保持されているので、雌部材に対して雄部材の姿勢が安定し、雄部材と雌部材との間がぐらつくことがなく、クイックコネクタの接続がいっそう安定する。また、雄部材の挿入端部の外周面と雌部材の中径部の内周面との間にリング状のシール部材が挟持されているので、雄部材と雌部材との間で高い水密性や気密性が得られる。その結果、クイックコネクタの中を流通する流体が外部に漏れ出すことが有効に防止されている。それゆえ本構成によれば、クイックコネクタの接続がいっそう安定し、クイックコネクタの気密性および液密性が向上するという効果がある。

【００４３】また、前記雌部材の前記収容部は周壁に開口した窓部を有し、クイックコネクタは、前記雌部材の前記収容部の外周側から該収容部に装着され弾性変形により拡径可能なＣ字形状部と、該Ｃ字形状部の両端部から半径方向内方に突出し前記保持部材の前記保持部の各前記開口窓に該収容部の各前記窓部からそれぞれ挿入された一対の係止突起部とを有する確認部材を備えると良い。ここで、前記確認部材は、前記雄部材と前記雌部材との結合が完了した時に、前記保持部材の前記開口窓を介して前記雄部材の前記リング状突部の外周面によって各前記係止突起部が遠心方向に押し出され、前記Ｃ字形状部が拡径される部材である。すなわち、雌部材に保持部材が挿入され第一係止部と第二係止部とが互いに係合している状態では、雌部材の窓部を通して確認部材の一対の係止突起部が保持部材の開口窓に挿入されている。この状態では、確認部材は雌部材の窓部に係合しており、確認部材は半径方向に引っ張られても雌部材から外れることはない。しかし、雌部材および保持部材の中に雄部材の挿入端部が適正に挿入され、雄部材のリング状突部が保持部材の開口窓に保持されると、リング状突部が確認部材の係止突起部の先端に当接して係止突起部を外側に押し出す。その結果、確認部材のＣ字形状部は拡径され、Ｃ字形状部と雌部材の窓部との係合が解けて、確認部材が半径方向に引っ張られると雌部材から外れるようになる。すなわち、作業員は、雌部材および保持部材に雄部材を挿入してクイックコネクタを接続した後、

確認部材を引っ張って雌部材から確認部材が外れることをもって、目視確認せずともクイックコネクタが適正に接続されていることを確認することができる。それゆえ本構成によれば、各種設備の奥まった部分で手探りで作業をしなければならない場合にも、目視確認なしにクイックコネクタが適正に接続されたことが確認されるので、手探りによるクイックコネクタの接続作業の信頼性が向上するという効果がある。

【００４４】

【実施例】以下、本発明のクイックコネクタの実施例について、図面を参照しつつ詳細に説明する。

［実施例１］

（実施例１の構成）クイックコネクタの実施例１は、図１に示すように、雄部材１と、雄部材１が挿入される雌部材２と、雄部材１が雌部材２から抜けないように固定する保持部材３と、雄部材１と雌部材２との間をシールするシール部材類４とを備えている。

【００４５】先ず、雄部材１は、先端１３から所定距離を隔てて設けられた遠心方向に突出するリング状突部１２をもつ略パイプ状の挿入端部１１を有する。雄部材１は、軟鋼製のパイプからなる一体部材であり、リング状突部１２は塑性加工により形成されている。また、雄部材１の先端１３は、外周面にアールが形成されるように絞り加工されており、雌部材２に挿入しやすくなっている。なお、雄部材１は、軸線周りに回転対称形をしている。

【００４６】次に、雌部材２は、雄部材１の挿入端部１１が挿入開口端部２１から収容部２２に挿入される略筒状の部材であって、ガラス繊維強化ナイロン樹脂製の一体成型品である。すなわち、雌部材２は、図２に示すように、軸線方向の一方に開口した挿入開口端部２１と、軸線方向の他方を向いて半径方向に延在する係止面２４ａをもつ第一係止部を周壁に有する略中空円筒状の収容部２２とを備えている。第一係止部としては、互いに対向して収容部２２の周壁に開口した一対の窓部２４が形成されており、第一係止部の係止面２４ａは、窓部２４の開口内面の一部である。また、雌部材２は、挿入開口端部２１のうち第一係止部としての窓部２４に対応する部分にも、挿入開口端部２１の開口端面２１ａから収容部２２の内周壁へと続く面取り状の案内テーパ面２１ｂを有する。

【００４７】より詳しく説明すると、雌部材２は、大きく分けて、前述の挿入開口端部２１および収容部２２と、チューブまたはホースに挿入されて接続されるホース接続部２７とから構成されている。挿入開口端部２１は、開口端面２１ａと案内テーパ面２１ｂとを有し、挿入開口端部２１の軸中央部には、雄部材１の挿入端部１１および保持部材３が挿入される挿入孔２１０が開口している。挿入開口端部２１の開口端面２１ａからは、収容部２２の内周壁へと続く面取り状の案内テーパ面２１ｂが全周に形成されており、雄部材１および保持部材３の収容部２２への挿入を容易にしている。

【００４８】収容部２２は、第一係止部としての窓部２４が形成されている大径部２３と、Ｏリング４１等のシール部材類４を収容している中径部２５（図１参照）と、雄部材１の先端１３が挿入される小径部２６とからなる。大径部２３には、第一係止部として、矩形の開口をもつ一対の窓部２４が互い対向して形成されている。窓部２４の一方の開口内面は、軸線方向の他方を向いて半径方向に延在する係止面２４ａである。窓部２４の開口内面は、係止面２４ａと、係止面２４ａに対向している対向面２４ｃと、互いに対向して周方向の両側面を形成している一対の開口側面２４ｂとからなる。

【００４９】ここで、再び図１に示すように、雌部材２の収容部２２は、大径部２３と中径部２５と小径部２６とからなる。大径部２３は、雄部材１のリング状突部１２と保持部材３の本体部３１および第二係止部３５とを収容する部分であり、内径だけではなく外径も最も大きい。中径部２５は、大径部２３よりも内径および外径が小さく、内周面と雄部材１の挿入端部１１の外周面とに当接するリング状のシール部材類４を保持する部分である。小径部２６は、中径部２５よりもさらに内径および外径が小さく、雄部材１の先端１３を収容する部分である。

【００５０】すると、雄部材１の先端１３が雌部材２の小径部２６に保持されているので、雌部材２に対して雄部材１の姿勢が安定し、雄部材１と雌部材２との間がぐらつくことがなく、本実施例のクイックコネクタの接続がいっそう安定する。また、雄部材１の挿入端部１１の外周面と雌部材２の中径部２５の内周面との間にリング状のシール部材類４が挟持されているので、雄部材１と雌部材２との間で高い水密性および気密性が得られる。その結果、本実施例のクイックコネクタの中を流通する流体が外部に漏れ出すことが有効に防止されている。それゆえ、本実施例のクイックコネクタの接続はいっそう安定しており、本実施例のクイックコネクタは気密性および液密性は十分に高い。

【００５１】より詳しく説明すると、雌部材２の大径部２３の外周部の表面は、軸線と同心の弧状円筒面である二つの外周面２３ａと互いに背向する二つの外側面２３ｂとからなる。外周面２３ａには窓部２４が形成されており、外側面２３ｂは窓部２４の対向方向に直角な法線をもつ平面である。外側面２３ｂは、作業員が自然に窓部２４を避けて雌部材２の大径部２３を握ることができるように意図されて設けられているが、雌部材２を台上等に置いたときに転がらないようにする作用をも有する。

【００５２】中径部２５は、大径部２３よりも直径が小さな円筒状の外周面を有し、中径部２５の内周面も、大径部２３の内周面より内径が小さく形成されている。同

じく図１に示すように、中径部２５の収容空間２２０には、樹脂製のリング部材４１を挟んで二つのＯリング４２が収容されている。それゆえ、雄部材１の挿入端部１１の前半部が中径部２５に挿入されると、中径部２５の内周面と挿入端部１１の円筒状の外周面との間で水密性および気密性が確保される。

【００５３】また、大径部２３と中径部２５との間の収容空間２２０には、ブッシュ４３が挿入されて固定されている。大径部２３と中径部２５との間の内周面には、内径が大きい部分と小さい部分とがあり、同内周面にブッシュ４３の外周面が係合してブッシュ４３が一端挿入されたら容易には抜けないようになっている。すなわち、ブッシュ４３の一方の端部にはフランジがあり、同フランジにより、ブッシュ４３が必要以上に雌部材２に押し込まれることが防止されている。また、ブッシュ４３の中間部にも外径の比較的小さなフランジがあり、同フランジにより、ブッシュ４３が雌部材２から抜けることが防止されている。ブッシュ４３によって封止されているので、リング部材４１およびＯリング４２が雌部材２の中径部２５から抜け出ることは防止されている。なお、ブッシュ４３の一方の内周面は、漏斗状に一方に向かって拡がって形成されており、雄部材１の先端１３を保持部材３に挿入することが容易にされている。

【００５４】なお、小径部２６は、中径部２５よりも小さな中空円筒状の部分であり、小径部２６の収容空間２２０には、先端１３を含む雄部材１の挿入端部１１の先端部が挿入されて嵌合する。一方、ホース接続部２７は、略中空円筒状の部分であり、中心部に流路孔２７０が形成されている。ホース接続部２７は、三つの段部２７１と一つのシール溝２７２とを外周面に有する。ここで、段部２７１は、他方に向かってテーパーした部分円錐面状の外周面をもつので、ホース等が接続された際にホースが抜け落ちることを防ぐ。また、シール溝は、Ｏリング等のシール部材を保持するための溝であり、ホース等の内周面との間にシール部材を保持して水密性および気密性を保つ。

【００５５】なお、雌部材２は軸線周りにほぼ回転対称形をしているが、大径部２３だけは軸線を含み互いに直交する二枚の対称面に関して対称形状をしている。最後に、保持部材３は、再び図１に示すように、大部分が雌部材２の挿入開口端部２１から収容部２２に挿入される弾性変形可能なポリアミド樹脂製の一体部材である。保持部材３は、雌部材２の収容部２２に適正に挿入されると、雄部材１のリング状突部１２と雌部材２の係止面２４ａとの間に介在して、雌部材２の挿入開口端部２１から挿入された雄部材１の挿入端部１１を雌部材２の収容部２２に装着させる部材である。

【００５６】すなわち、保持部材３は、弾性変形により拡径および縮径が可能な断面略Ｃ字形状の本体部３１と、雌部材２の係止面２４ａと係合する第二係止部３５と、クイックコネクタを取り外す際に使用する一対の操作アーム部３６とを有する。本体部３１は、他方に向かって内周面３２ａが縮径しているテーパ壁部３２と、テーパ壁部３２の他方の端部に設けられ雄部材１の挿入端部１１のリング状突部１２が嵌合して挿入端部１１を保持する保持部３４とをもつ部分である。第二係止部３５は、本体部３１の一方の端部から遠心方向に突出して本体部３１と一体的に形成された凸部であり、雌部材２の第一係止部としての窓部２４と係合する部分である。操作アーム部３６は、本体部３１の一方の端部から一方に突出し、雌部材２の収容部２２への挿置時にも挿入開口端部２１から突出する操作端部３７をもち、本体部３１の弾性力により遠心方向へ付勢される互いに背向した一対の部分である。

【００５７】ここで、保持部材３の保持部３４は、雄部材１のリング状突部１２の一部が嵌合する開口窓３４０を有する。また、雌部材２の収容部２２は、保持部材３の開口窓３４０を外側から見通せる位置に開口した窓部２４を周壁に有する。それゆえ、雄部材１のリング状突部１２が保持部材３の開口窓３４０に嵌合すると、リング状突部１２の一部が開口窓３４０から露出し、その様子を雌部材２の窓部２４を通して外側から目視確認することができる。

【００５８】一方、保持部材３の本体部３１の外側面は、第二係止部３５から他方に進むにつれ軸線に近づく傾斜面３２ｃをもつ。それゆえ、保持部材３を雌部材２に挿入する際、保持部材３の係止面２４ａが雌部材２の挿入開口端部２１に内接し、保持部材３が雌部材２に押し込まれるにつれて自然に縮径される。その結果、雌部材２の中に保持部材３を容易に挿入することができる。

【００５９】また、保持部材３の本体部３１は、周方向に互いに隣り合う保持部３４の間に、他方から形成された欠損部３３０（図４参照）を有する。それゆえ、保持部材３を雄部材１または雌部材２に着脱する際に、保持部材３の拡径および縮径が容易になるばかりではなく、軸対称でない弾性変形も容易になる。その結果、保持部材３の着脱がより容易になる。

【００６０】保持部材３の構成について、図３～図８を参照しつつ、以下により詳しく説明する。ここで、図３は保持部材３を一方の斜めから見た斜視図であり、図４は保持部材３を図１と同じ方向から見た側面図である。図５は図４のＶ－Ｖ断面を示す底断面図であり、図６は図４のＶＩ矢視による保持部材３の底面図、図７は図４のＶＩＩ矢視による保持部材３の正面図、図８は図４のＶＩＩＩ矢視による保持部材３の背面図である。

【００６１】保持部材３の本体部３１は、図３に示すように、弾性変形により拡径および縮径が可能な断面略Ｃ字形状の部分である。断面略Ｃ字形状の両端の互いに対向した端面間で形成された開口の間隔は、雄部材１の外径よりも少し狭く設定されている。本体部３１は、図４

に示すように、互いに対向するロート状の内周面３２ａをもつ一対のテーパ壁部３２と、両テーパ壁部３２を結ぶ連結部３３とを有する。両テーパ壁部３２の互いに対向した内周面３２ａは、図３、図５および図８に示すように、操作アーム部３６の内側面３６ａと連続して一方から他方に行くに従って狭まる漏斗状のテーパー面を形成している。

【００６２】一方、保持部材３の本体部３１の外周面は、図１、図４、図６および図７に示すように、第二係止部３５から他方に向かうにつれて求心方向に近づくように傾いている傾斜面３２ｃを有する。傾斜面３２ｃは、第二係止部３５から他方に向かうにつれて周方向にも幅が細くなっており、第二係止部３５から他方に向かってテーパーした形状を有する。

【００６３】保持部材３の本体部３１はまた、各テーパ壁部３２の他方の端部に、対向する一対の開口窓３４０をもつ一対の保持部３４を有する。図４に示すように、両保持部３４は、Ｃ字形状部の開口部と連結部３３の欠損部３３０とによって互いに隔てられている。各保持部３４は、図６に示すように、テーパ壁部３２と所定距離を隔てて周方向に延在する窓枠部３４１と、テーパ壁部３２から他方に突出し窓枠部３４１を両端で支持する支持部３４２とをもつ。

【００６４】各保持部３４に形成された開口窓３４０は、テーパ壁部３２と、テーパ壁部３２と所定距離を隔てて周方向に延在する窓枠部３４１と、テーパ壁部３２から他方に突出し窓枠部３４１の両端を支持する支持部３４２とにより囲まれている。それゆえ、開口窓３４０は、テーパ壁部３２の他方の端面である他端面３２ｂと、窓枠部３４１の一方の端面である内端面３４１ａとによって、一方と他方とを挟まれている。

【００６５】また、窓枠部３４１は、他方の端面である先端面３４１ｂを有し、先端面３４１ｂは保持部材３の他方の先端面と面一に形成されている。さらに、支持部３４２の内周面は、図５に示すように、雄部材１のリング状突部１２の外周面１２ｃ（図９参照）が当接する内接面３４２ａを形成している。なお、保持部３４の寸法は、内接面３４２ａが雄部材１のリング状突部１２に対して軽い締まり嵌めになる程度に設定されている。

【００６６】保持部材３の第二係止部３５は、図４および図６に示すように、本体部３１から外側に突出した凸部であり、一方に向いた一端面３５ａを有する。一端面３５ａは、再び図１に示すように、雌部材２の窓部２４の係止面２４ａに当接して保持部材３が雌部材２から抜け落ちることを防ぐ。それゆえ、保持部材３の本体部３１は、無負荷状態で第二係止部３５が雌部材２の係止面２４ａと所定の半径方向の深さで係合するだけの大きさに形成されている。

【００６７】操作アーム部３６は、図３～図６に示すように、本体部３１の一方の端部から一方に突出している。操作アーム部３６は、再び図１に示すように、雌部材２の収容部２２への挿置時にも挿入開口端部２１から突出する操作端部３７をもつ。操作端部３７は、外側の面が雌部材２の大径部２３から半径方向へはみ出さない大きさに形成されており、クイックコネクタが接合した状態で周囲の他の部材等が操作端部３７に不用意に当接することが防止されている。なお、操作アーム部３６は、雌部材２の収容部２２への収容時にも、本体部３１の弾性力により遠心方向へ付勢されており、操作アーム部３６の内側面３６ａは、雄部材１の外周面から距離を隔てている。

【００６８】なお、保持部材３の形状は、再び図４に示すように、Ｖ－Ｖ面に関して面対称である。

（実施例１の作用効果）クイックコネクタの本実施例には、接続と取り外しとの二通りの作用がある。先ず、本実施例のクイックコネクタの接続は、次のように二通りの手順のうちいずれによっても行うことができる。

【００６９】第一の接続手順は、図９に示すように、雄部材１の挿入端部１１が保持部材３の保持部３４によって保持され、雄部材１と保持部材３とが組み立てられた状態で行われる。すなわち本手順は、保持部材３の開口窓３４０に雄部材１のリング状突部１２が嵌合した状態で行われる。この状態で、雄部材１の挿入端部１１は保持部材３ごと雌部材２の収容部２２に挿入され、雌部材２の窓部２４の係止面２４ａに保持部材３の第二係止部３５が係合させられる。

【００７０】本手順では先ず、雄部材１の挿入端部１１を保持部材３に保持させる際には、保持部材３の一方の端部からおおよそ軸線を合わせて雄部材１が先端から挿入される。雄部材１の軸線と保持部材３の軸線とが若干ずれた状態で雄部材１を保持部材３に挿入しようとすると、操作アーム部３６の内側面３６ａが雄部材１の挿入端部１１に当接し、軸線のずれが自然に修正される。

【００７１】すると、雄部材１の挿入端部１１に設けられたリング状突部１２が、外周面１２ｃで保持部材３のテーパ壁部３２の内周面３２ａ（図３参照）に当接する。そして、保持部材３の断面略Ｃ字形状の本体部３１を押し拡げつつ、雄部材１の挿入端部１１が本体部３１の他方へと挿入されていく。さらに雄部材１が保持部材３に深く挿入され、雄部材１のリング状突部１２が保持部材３の保持部３４に達すると、自然にリング状突部１２が保持部３４の開口窓３４０に嵌合する。その結果、同じく図９に示すように、雄部材１の挿入端部１１は保持部材３の保持部３４に保持されて雄部材１と保持部材３とが組み立てられる。

【００７２】しかる後、雌部材２の窓部２４の係止面２４ａと保持部材３の第二係止部３５との周方向の位置が合わせられて、雄部材１の挿入端部１１が保持部材３と一緒に雌部材２の挿入開口端部２１から収容部２２に挿入される。その結果、所定の挿入深さに達すると、再び

図１に示すように、保持部材３の第二係止部３５が、保持部材３の断面略Ｃ字形状の本体部３１の弾性力によって外側に拡がり、窓部２４の窓部２４に係合する。

【００７３】すなわち、雌部材２の窓部２４の係止面２４ａに、保持部材３の第二係止部３５の一端面３５ａ（図４参照）が対向し、係止面２４ａに一端面３５ａが当接して保持部材３が雌部材２から抜けなくなる。その結果、雄部材１のリング状突部１２の一端面１２ａと雌部材２の窓部２４の係止面２４ａとの間に、保持部材３の本体部３１および第二係止部３５が介在するに至る。すると、雄部材１を雌部材２から引き抜こうとしても、雄部材１は雌部材２から抜けなくなり、雄部材１と雌部材２との接続が完了する。

【００７４】第二の接続手順では、先ず、雌部材２の収容部２２に保持部材３が挿入され、雌部材２の窓部２４に保持部材３の第二係止部３５が係合させられて、雌部材２の収容部２２に保持部材３が保持される。次に、雄部材１の挿入端部１１が、雌部材２の収容部２２および保持部材３に挿入される。すなわち、本手順では先ず、雌部材２の第一係止部としての窓部２４に保持部材３の第二係止部３５の周方向の位置が合わせされて、保持部材３が雌部材２の収容部２２に挿入開口端部２１から挿入される。この際、雌部材２の挿入開口端部２１の案内テーパ面２１ｂに保持部材３の第二係止部３５の端部が摺接し、保持部材３が雌部材２に挿入されるにつれて、保持部材３が自然に縮径させられて雌部材２の収容部２２に挿入される。

【００７５】そして、保持部材３が所定の挿入深さに達すると、保持部材３の第二係止部３５が本体部３１の弾性力により拡径方向に付勢されて外側に向かって変位し、雌部材２の窓部２４に係合する。その結果、再び図１に示すように、保持部材３は雌部材２の収容部２２から抜け落ちることなく保持される。ここで、保持部材３の操作アーム部３６の操作端部３７は、雌部材２の挿入開口端部２１から一方に突出した状態に保たれている。

【００７６】しかる後、おおよそ軸線を合わせて、雌部材２および保持部材３の一方の端部から、雄部材３が先端１３から挿入される。この際、保持部材３の操作アーム部３６の内側面３６ａが、雄部材１のリング状突部１２に摺接して案内しつつ、雄部材１の挿入端部１１が保持部材３に挿入されてゆく。保持部材３の操作アーム部３６の内側面３６ａは、テーパ壁部３２の内周面３２ａに連続しているので、雄部材１のリング状突部１２は、滑らかに本体部３１の内部へとさらに挿入されていく。

【００７７】その結果、雄部材３の挿入端部１１に設けられたリング状突部１２が、外周面１２ｃで保持部材３のテーパ壁部３２の内周面３２ａに当接し、保持部材３の断面略Ｃ字形状の本体部３１を押し拡げつつ本体部３１の他方へと挿入されていく。この際、保持部材３の本体部３１は雄部材１のリング状突部１２によって拡径されていくので、縮径する方向に保持部材３の弾性力が作用する。

【００７８】さらに雄部材１が保持部材３に深く挿入され、雄部材１のリング状突部１２が保持部材３の保持部３４に達すると、自然にリング状突部１２が保持部３４の開口窓３４０に嵌合する。すなわち、保持部材３の本体部３１の弾性力により互いに対向した一対の保持部３４の間隔が狭められて、リング状突部１２が開口窓３４０にはまり込み、雄部材１の挿入端部１１は保持部材３の保持部３４に挟持される。

【００７９】すると、同じく図１に示すように、雄部材１のリング状突部１２と雌部材２の窓部２４の係止面２４ａとの間に保持部材３の本体部３１および第二係止部３５が介在するに至る。その結果、操作アーム部３６の操作なしには、雄部材１は雌部材２から抜けなくなって雄部材１と雌部材２との接続が完了する。すなわち、雄部材１を雌部材２から引き抜こうとする外力が作用すると、雌部材２の窓部２４の係止面２４ａに保持部材３の第二係止部３５の一端面３５ａが当接する。すると、雄部材１のリング状突部１２の一端面１２ａと雌部材２の窓部２４の係止面２４ａとの間に、保持部材３の本体部３１および第二係止部３５が介在して、圧縮応力に耐える。ここで、保持部材３の本体部３１および第二係止部３５は十分に強固に形成されているので、割れたり挫屈したりすることなしに、圧縮応力に耐えることができる。その結果、雄部材１を雌部材２から引き抜こうとしても、操作アーム部３６を操作しない限り雄部材１は雌部材２から抜けなくなり、雄部材１と雌部材２とは強固に接続されるに至る。

【００８０】逆に、雄部材１をさらに雌部材２に押し込もうとする外力が作用すると、同じく図１に示すように、保持部３４の窓枠部３４１が、雌部材２に嵌合して固定されたブッシュ４３と雄部材１のリング状突部１２との間に挟持される。それゆえ、雄部材１に作用した押圧力は、保持部３４の窓枠部３４１を介して雌部材２に保持されたブッシュ４３に伝達される。ブッシュ４３は雌部材２に強固に固定されており、保持部３４の窓枠部３４１は十分な押圧力に耐えることができるので、本実施例のクイックコネクタは、雄部材１を雌部材２に押し込もうとする外力にも耐えることができる。

【００８１】この際、保持部材３の操作端部３７は、雌部材２の挿入開口端部２１に押圧力をもって接触することがないように配設されている。それゆえ、保持部材３の他の部分には外力は伝達されず応力が発生しないので、保持部材３が押し込み外力によって破損することは防止されている。その結果、本実施例のクイックコネクタの接続は極めて容易でありながら、強固な接続が得られる。また、接続前に保持部材が雌部材または雄部材に保持されているので、保持部材を作業現場で取り落とすことが防止されている。そればかりではなく、雄部材お

よび雌部材のうち一方が固定されていれば、クイックコネクタの接続手順を、前記いずれの手順であっても、片手でこなすことも可能である。

【００８２】さらに、雄部材１のリング状突部１２が保持部材３の開口窓３４０に嵌合する際には、保持部材３が弾性力をもって急激に縮径し、パチッという音がして嵌合した手応えがある。同様に、保持部材３の第二係止部３５が雌部材２の第一係止部である窓部２４に嵌合する際にも、保持部材３が弾性力をもって急激に拡径し、パチッという音がして嵌合した手応えがある。そればかりではなく、窓部２４に保持部材３の第二係止部３５が嵌合していることも、保持部材３の開口窓３４０に雄部材１のリング状突部１２が嵌合していることも、雌部材２の窓部２４を通して明瞭に目視確認することができる。ここで、本実施例のクイックコネクタを接続する際には、自然に作業員が手指で雌部材２の大径部２３の平坦な外側面２３ｂを持つので、窓部２４からの視認は容易になる。それゆえ、本実施例のクイックコネクタでは、雄部材１と雌部材２との接続がより確実に行われる。

【００８３】なお、同じく図１に示すように、雌部材２の収容部２２の中径部２５の内周面に当接し、リング部材４１を挟んで二つのＯリング４２が配設されている。二つのＯリング４２は、雄部材１の挿入端部１１の円筒状の外周面と雌部材２の内周面との間に介在し、雄部材１と雌部材２との間で気密性および液密性を保つ作用を果たしている。

【００８４】一方、本実施例のクイックコネクタの取り外しおよび分解は、次のようにして行われる。保持部材３は、同じく図１に示すように、テーパ壁部３２および保持部３４をもち弾性変形可能な断面略Ｃ字形状の本体部３１と、雌部材２の窓部２４と係合する第二係止部３５と、雌部材２から操作端部３７が突出している操作アーム部３６とを持つ。ここで操作アーム部３６は、本体部３１の弾性力により外側へ付勢されているので、雌部材２の収容部２２へ挿入された状態でも、雄部材１の外周面から離れており、同様に、本体部３１のテーパ壁部３２も雄部材１の外周面から離れている。それゆえ、操作アーム部３６の操作端部３７を指先等で求心方向へ押し縮めれば、本体部３１のテーパ壁部３２も求心方向へ縮径する。すると、テーパ壁部３２の縮径に伴い、第二係止部３５が雌部材２の係止面２４ａから求心方向へ外れるので、雄部材１を引き抜けば雌部材２から雄部材１および保持部材３を取り外すことができる。

【００８５】その際、保持部材３の保持部３４には雄部材１のリング状突部１２が嵌合しているので、再び図９に示すように、保持部材３は雄部材１の挿入端部１１に係合して雄部材１と一体に組み立てられた状態を保っている。それゆえ、雄部材１および保持部材３を雌部材２から引き抜いても、不用意に保持部材３が雄部材１から脱落することがない。

【００８６】雄部材１と保持部材３とを分解して雄部材１から保持部材３を取り外すには、保持部材３の断面略Ｃ字形状の本体部３１の開口から雄部材１の挿入端部１１が出るように、保持部材３を軸直角方向外方に引っ張れば良い。その際、断面略Ｃ字形状の本体部３１の開口を雄部材１のリング状突部１２が通過できる分だけ保持部材３の本体部３１が拡径してＣ字形状の断面が拡がるだけで済み、保持部材３の大変形は避けられる。それゆえ、雄部材１から保持部材３を取り外す際にも、保持部材３が大変形によって破損するような不都合は防止されている。また、作業員が片手で雄部材１から保持部材３を取り外すこともでき、保持部材３の雄部材１からの取り外しがきわめて容易である。その結果、保持部材３は損傷することなく雌部材２からも雄部材１からも分離できるので、何回でも保持部材３を利用することができる。もちろん、保持部材３ばかりではなく、雄部材１および雌部材２も再利用可能である。

【００８７】したがって、本実施例のクイックコネクタによれば、保持部材３の再利用が容易であるばかりではなく、リリース具等の道具を使わないでもクイックコネクタの取り外しおよび分解が容易であるという効果がある。また、前述のように、クイックコネクタの接続が確実かつ容易に行われ得るという効果がある。

［実施例２］

（実施例２の構成）クイックコネクタの実施例２は、図１０、図１１および図１２に示すように、雄部材１が挿入されていない状態で確認部材５が付加されている点を除き、実施例１と同様の構成である。それゆえ、本実施例では確認部材５の構成および作用効果について重点的に説明する。

【００８８】すなわち確認部材５は、雌部材２と確認部材５とを図１３に示すように、Ｃ字形状部５１と一対の係止突起部５２と取手部５３とから構成された樹脂製の一体部材である。Ｃ字形状部５１は、雌部材２の収容部２２の外周側から収容部２２に装着され、弾性変形により拡径可能なＣ字形状の部分である。一対の係止突起部５２は、Ｃ字形状部５１の両端部から半径方向内方に突出し、保持部材３の保持部３４の各開口窓３４０（図４参照）に雌部材２の収容部２２の各窓部２４からそれぞれ挿入された一対の突起部分である。取手部５３は、Ｃ字形状部５１の中央部に連結されたリング状の取っ手部分である。

【００８９】ここで、確認部材５は、雄部材１と雌部材２との結合が完了した時に、保持部材３の開口窓３４０を介して雄部材１のリング状突部１２の外周面１２ｃによって各係止突起部５２が遠心方向に押し出され、Ｃ字形状部５１が拡径される部材である。なお、確認部材５は、第二の対称面Ｑに関して対称形状をしており、第一の対称面Ｐに関していずれの方向からも、雌部材２およ

び保持部材３に係合可能である。

【００９０】確認部材５の構成について、同じく図１３を参照しつつより詳しく説明する。Ｃ字形状部５１は、雌部材２の大径部２３の外周面２３ａおよび外側面２３ｂにぴったりと係合し、樹脂のもつ弾性力をもって一対の係止突起部５２を雌部材２の窓部２４から内部に挿入している。一対の係止突起部５２は、それぞれ係合面５２ａと先端面５２ｂと摺接面５２ｃとをもつ。係止面２４ａは、Ｃ字形状部５１と一対の係止突起部５２との間に切り欠きを形成する面であり、雄部材１が挿入されていない状態では雌部材２の窓部２４の開口側面２４ｂと係合している。それゆえ、作業員が取手部５３に指をかけて確認部材５を引っ張っても、係止面２４ａが窓部２４の開口側面２４ｂに係合しており、Ｃ字形状部５１が拡径しないので確認部材５が雌部材２から脱落することはない。

【００９１】先端面５２ｂは、図１４に示すように、雄部材１のリング状突部１２が適正に挿入されると、リング状突部１２に少なくとも一部で当接し、一対の係止突起部５２の間隔が押し拡げられる着力点となる。このように一対の係止突起部５２の間隔が拡げられ、Ｃ字形状部５１が拡径されると、係合面５２ａは雌部材２の窓部２４を外れる。この状態では窓部２４の縁は摺接面５２ｃに当接している。それゆえ、作業員が取手部５３に指をかけて確認部材５を引っ張ると、摺接面５２ｃが雌部材２の窓部２４の縁に摺接しつつ、Ｃ字形状部５１がいよいよ拡径されて遂には確認部材５が雌部材２から外れるに至る。

【００９２】（実施例２の作用効果）再び図１０に示すように、雌部材２に保持部材３が挿入され窓部２４と第二係止部３５とが互いに係合している状態では、雌部材２の窓部２４を通して確認部材５の一対の係止突起部５２が保持部材３の開口窓３４０に挿入されている。この状態では、再び図１３に示すように、確認部材５は係合面５２ａで雌部材２の窓部２４に係合しており、確認部材５は半径方向に引っ張られても雌部材２から外れることはない。

【００９３】しかし、雌部材２および保持部材３の中に雄部材１の挿入端部１１が適正に挿入され、雄部材１のリング状突部１２が保持部材３の開口窓３４０に嵌合すると、状況は異なってくる。すなわち、再び図１４に示すように、リング状突部１２の外周面１２ｃが、確認部材５の係止突起部５２の先端面５２ｂに当接して互いに対向した係止突起部５２を外側に押し出す。その結果、確認部材５のＣ字形状部５１は拡径され、確認部材５の係合面５２ａが雌部材２の窓部２４から外れて、確認部材５の摺接面５２ｃが窓部２４の縁に摺接するようになる。すると、確認部材５のＣ字形状部５１と雌部材２の窓部２４との係合が解けてしまう。その結果、確認部材５が半径方向に引っ張られると、摺接面５２ｃが雌部材２の窓部２４に摺接しつつＣ字形状部５１がいっそう拡径し、確認部材５は雌部材２から外れるようになる。

【００９４】すなわち、作業員は、雌部材２および保持部材３に雄部材１を挿入してクイックコネクタを接続した後、取手部５３に指をかけて確認部材５を引っ張れば良い。確認部材５を引っ張った結果、雌部材２から確認部材５が外れることをもって、作業員は、目視確認せずともクイックコネクタが適正に接続されていることを確認することができる。それゆえ、各種設備の奥まった部分で手探りで作業をしなければならない場合にも、目視確認なしにクイックコネクタが適正に接続されたことを確認することができる。

【００９５】その結果、本実施例によれば、手探りによるクイックコネクタの接続作業の信頼性が向上するという効果がある。また、作業員が取手部５３に指をかけて引っ張らないと確認部材５は雌部材２から外れず、確認部材５が自然に外れるようなことはないので、確認部材５を取り落として紛失することはない。

（実施例２の変形態様１）本実施例の変形態様１として、Ｃ字形状部５１と取手部５３との間に雌部材２の大径部２３と係合する中間部をもつ確認部材５を有するクイックコネクタの実施が可能である。本変形態様では、作業員が取手部５３をねじった場合にも、中間部が雌部材２に係合してねじりに耐えるので、Ｃ字形状部５１がねじられて拡径することがない。それゆえ、クイックコネクタが適正に接合されない限り、作業員の不適正な操作によっても確認部材５は外れないので、クイックコネクタの接続の信頼性がより向上するという効果がある。

【００９６】（実施例２の変形態様２）本実施例の変形態様２として、一部に切り欠きをもつリング状の取手部５３をもつ確認部材５を有するクイックコネクタの実施が可能である。本変形態様では、雌部材２に保持部材３および雄部材１が適正に嵌合していない状態で作業員が無理矢理確認部材５を引き抜こうとすると、取手部５３の一部が切り欠きから破断する。それゆえ、クイックコネクタが適正に接合されない限り、作業員の不適正な操作によっても確認部材５は外れないので、クイックコネクタの接続の信頼性がより向上するという効果がある。

【００９７】［実施例３］

（実施例３の構成）クイックコネクタの実施例３は、図１５に示すように、雄部材１および雌部材２は実施例１のそれらと同一であり、保持部材３の保持部３４’の構成が実施例１のそれと異なる。

【００９８】すなわち、図１６に示すように、保持部材３の保持部３４の互いに対向する一対の保持部３４’には、実施例１では開口窓３４０が形成されているのに対し、それぞれ中心方向に開口した溝３４０’が形成されている。再び図１５に示すように、保持部３４’の溝３４０’には雄部材１のリング状突部１２が嵌合し、雄部材１は保持部材３を介して雌部材２に固定される。

【００９９】（実施例３の作用効果）本実施例のクイックコネクタの作用効果は、おおむね実施例１の作用効果と同一である。細かい違いについて述べれば、本実施例の保持部材３の方が、保持部３４’の強度が向上してより堅牢になっている。

【０１００】逆に実施例１の保持部材３の方が勝っている点は多い。すなわち、実施例１では、雌部材２に挿入された状態でも、雄部材１のリング状突部１２が保持部材３の開口窓３４０に嵌合していることが、雌部材２の収容部２２の窓部２４を通して直接目視確認できる。また、実施例１の保持部材３では、実施例２のように、確認部材５を採用することが可能である。さらに、実施例１の保持部材３の方が、樹脂の射出成形の型割りの都合上、製造が容易である。

【０１０１】［実施例４］

（実施例４の構成）クイックコネクタの実施例４は、雌部材２の大径部２３の構成と保持部材３の構成の一部とが実施例１と異なり、雄部材１を含むその他の構成は実施例１と同様である。それゆえ、本実施例では雌部材２の構成と保持部材３の構成のうち実施例１と異なる部分について説明する。

【０１０２】雌部材２は、以下の点で実施例１のそれと構成が異なっている。第一に、雌部材２は、図１７〜図１９に示すように、収容部２２の内周壁から求心方向に所定厚さだけ突出して収容部２２に保持部材３が挿入される際に保持部材３の欠損部３３０に嵌合可能な一対の嵌合凸部２３１を有する。すなわち、一対の嵌合凸部２３１は、雌部材２の大径部２３の内周面から求心方向に所定の厚さで突出し互いに対向した凸部である。各嵌合凸部２３１は、大径部２３の内周面の他方の端部から一方へ突出するような形状で形成されており、その先端は保持部材３が係合しやすいようにテーパー状に形成されている。

【０１０３】第二に、雌部材２の大径部２３の内周面には、窓部２４に隣接して周方向の両側に、案内凹部２３２が形成されている。案内凹部２３２は、窓部２４に接する方を除いて三方が斜面によって形成された凹部である。保持部材３の第二係止部３５が案内凹部２３２にはまり込むと、保持部材３はその弾性力で自然に周方向に回転し、第二係止部３５が雌部材２の窓部２４にはまり込む。

【０１０４】第三に、雌部材２は、図２０に示すように、挿入開口端部２１のうち第一係止部としての一対の窓部２４と周方向に異なる位置に、求心方向へ所定の厚さで突出し周方向に所定の幅で延在する一対の規制突部２１１を有する。規制突部２１１は、雄部材１（図９参照）に取り付けられた保持部材３（図２４参照）が適正な回転角度位置にない場合には、保持部材３の第二係止部３５と当接して保持部材３が雌部材２の収容部２２の内部に挿入されることを阻止する突部である。すなわち、規制突部２１１は、図２１に示すように、挿入開口端部２１の半径Ｒの内周面よりも内方に突出しており、保持部材３から遠心方向へ突出した一対の第二係止部３５の進入を阻止する。そればかりではなく、図２２に示すように、規制突部２１１の一部は、挿入開口端部２１の開口端面２１ａから一方へ台形状に突出して規制端面２１１ａを形成している。図２３に示すように、規制突部２１１の内側面２１１ｂは、雌部材２の軸長方向と平行に形成されている一次曲面である。

【０１０５】第四に、雌部材２は、再び図２２に示すように、挿入開口端部２１のうち第一係止部としての窓部２４に対応する部分に、挿入開口端部２１の開口端面２１ａから収容部２２の内周壁へと続く面取り状の案内テーパ面２１ｂを有する。すなわち、案内テーパ面２１ｂは、挿入開口端部２１のうち周方向の窓部２４に相当する部分にのみ対向して一対が形成されており、前述の一対の規制突部２１１とは周方向に所定間隔を空けて形成されている。

【０１０６】第五に、雌部材２は、再び図２３に示すように、各案内テーパ面２１ｂの両端に、挿入開口端部２１の開口端面２１ａから各案内テーパ面２１ｂへと続く一対の案内斜面２１ｃを有する。すなわち、案内斜面２１ｃは、各案内テーパ面２１ｂの両端に形成されており、案内斜面２１ｃに押圧力をもって当接した保持部材３の第二係止部３５（図２４参照）を周方向に回転移動させて案内テーパ面２１ｂに当接させる。

【０１０７】第六に、雌部材２は、同じく図２３に示すように、各規制突部２１１の両端に、規制突部２１１の規制端面２１１ａから周方向に延在して開口端面２１ａにまで達する案内斜面２１１ｃを有する。各規制突部２１１の案内斜面２１１ｃの先端は、案内テーパ面２１ｂの両端の案内斜面２１ｃの先端に接している。それゆえ、規制突部２１１の案内斜面２１１ｃに押圧力をもって当接した保持部材３の第二係止部３５は、案内斜面２１１ｃおよび案内斜面２１ｃに摺接しつつ周方向に移動する。それゆえ、保持部材３の第二係止部３５は、規制突部２１１から少しでも外れると、案内斜面２１１ｃから案内斜面２１ｃを経て案内テーパ面２１ｂにまで滑り込む。

【０１０８】一方、保持部材３は、以下の点で実施例１のそれと構成が異なっている。第一に、保持部材３は、図２４に示すように、第二係止部３５の他方に軸線方向と直交して形成された所定の面積の規制平面３５ｂを有する。規制平面３５ｂは、雄部材１に取り付けられた保持部材３が適正な回転角度位置にない場合には、雌部材１の規制突部２１１の規制端面２１１ａに当接して保持部材３が雌部材２の収容部２２の内部に挿入されることを阻止する平面である。なお、第二係止部３５の他方の端部の角は、適正なアールを付けて形成されており、第二係止部３５が適正な回転角度位置にある場合には、雌

部材２の案内テーパ面２１ｂに摺接するようになっている。

【０１０９】第二に、保持部材３の傾斜面３２ｃは、各第二係止部３５の規制平面３５ｂから保持部３４に至るまでまっすぐに形成されている。すなわち、傾斜面３２ｃは、規制平面３５ｂからテーパ壁部３２の他端面３２ｂに至るまで途中に中折れやくびれがない略円錐面状のテーパ面で形成されている。それゆえ、接続後に雄部材１と雌部材２とが引っ張られ、過大な圧縮応力が傾斜面３２ｃを形成するテーパ壁部３２に作用しても、テーパ壁部３２が局部挫屈するようなことな防止されている。

【０１１０】第三に、連結部３３の欠損部３３０の隅にアールが形成されており、応力集中が軽減されているので、欠損部３３０の隅から亀裂が入ることが防止されている。それゆえ、保持部材３はさらに多数回再利用することができるようになる。

（実施例４の作用効果）本実施例のクイックコネクタは、以上のように構成されているので、以下のような作用効果をもつ。

【０１１１】先ず、雄部材１に嵌合した保持部材３（図９参考）が、雌部材２に対して正規の回転角度位置（窓部２４と第二係止部３５とが同一角度位置にある状態）から中心軸周りに９０°程度ずれて挿入されようとする場合を想定する。すると、保持部材３の一対の第二係止部３５に形成された他端面３５ｂが、雌部材２の規制突部２１１の規制端面２１１ａに当接し、雄部材１を保持した保持部材３はそれ以上、雌部材２に挿入され得なくなる。すなわち、かなりの押圧力をもって雄部材１を保持した保持部材３を雌部材２に挿入しようとしても、阻止される。それゆえ、保持部材３が雌部材２に対して正規の回転角度位置から大きく外れていることが、作業員にも容易に認識される。

【０１１２】次に、作業員が保持部材３を回転移動させて正規の回転角度位置を探っていく場合を想定する。保持部材３の第二係止部３５の他端面３５ｂが雌部材２の規制平面３５ｂからずれると、保持部材３の第二係止部３５の周方向端部が雌部材２の規制突部２１１の案内斜面２１１ｃに当接する。すると、保持部材３は雌部材２に押し込まれる方向に外力を受けているから、保持部材３の第二係止部３５の周方向端部が雌部材２の案内斜面２１１ｃに摺接して滑る。続いて保持部材３の第二係止部３５の周方向端部は、案内斜面２１１ｃに隣接している案内斜面２１ｃに摺接し続ける。その結果、保持部材３の第二係止部３５は、雌部材２の案内テーパ面２１ｂに当接するに至る。この間、雄部材１を保持した保持部材３は、さらに少しだけ雌部材２に挿入される。

【０１１３】保持部材３の第二係止部３５が雌部材２の案内テーパ面２１ｂに当接した状態では、保持部材３はおおむね正規の回転角度位置にあり、保持部材３の挿入を阻止するものはなくなる。それゆえ、雄部材１を保持した保持部材３は、縮径されつつ雌部材２の中にさらに押し込まれることが可能になり、保持部材３の第二係止部３５は雌部材２の挿入開口端部２１を過ぎて収容部２２にまで挿入されるに至る。すると、雌部材２の一対の嵌合凸部２３１の先端が、保持部材３の連結部３３の欠損部３３０と本体部３１のＣ字状の開口部とに嵌合し始める。各嵌合凸部２３１の先端は、前述のようにテーパーしているので、保持部材３の回転角度位置が正規の位置から少しずれていても回転角度位置が修正されつつ、保持部材３は雌部材２の収容部２２に挿入されていく。この際、雌部材２の窓部２４の両側に形成されている案内凹部２３２が、保持部材３の弾性力で外側へ付勢された第二係止部３５を窓部２４へと導く。雄部材１を保持した保持部材３が雌部材２の収容部２２に規定の深さまで挿入されると、保持部材３の弾性力で外側へ付勢された第二係止部３５は、第一係止部としての窓部２４に嵌合するに至る。

【０１１４】いったん保持部材３の第二係止部３５が雌部材２の窓部２４に嵌合してしまうと、操作アーム部３６を作業員が操作しない限り、押しても引いても雄部材１と雌部材２との結合を解くことはできない。保持部材３のもつこのような係止作用は、実施例１のそれと同様である。すなわち、本実施例によれば、雄部材１を保持した保持部材３を、正規の角度位置を中心にある程度広い範囲で合わせて雌部材２に押し込むだけで、容易に雄部材１と雌部材２とを結合させることができる。その結果、前述の実施例１の効果に加えて、作業員の負担が軽減されて作業時間が短縮されるだけではなく、よりいっそう確実なクイックコネクタの接続が得られるようになるという効果がある。

【０１１５】また、案内凹部２３２が設けられているので、予め保持部材３を大径部２３に保持した雌部材２に雄部材１を挿入する場合には、保持部材３の本体部３１が拡径し易くなり、雄部材１の挿入力を低減することができる。

【０１１６】

【発明の効果】以上詳述したように、本発明のクイックコネクタによれば、保持部材の再利用が容易であるばかりではなく、リリース具等の道具を使わないでも取り外しおよび分解が容易であるという効果がある。

【図面の簡単な説明】

【図１】　実施例１としてのクイックコネクタの全体構成を示す半断面図

【図２】　実施例１の雌部材の構成を示す半断面図

【図３】　実施例１の保持部材の構成を示す斜視図

【図４】　実施例１の保持部材の構成を示す側面図

【図５】　実施例１の保持部材の構成を示す底断面図

【図６】　実施例１の保持部材の構成を示す底面図

【図７】　実施例１の保持部材の構成を示す正面図

【図８】　実施例１の保持部材の構成を示す背面図

【図９】　実施例１の雄部材と保持部材との係合状態を示す側面図

【図１０】実施例２の雌部材、保持部材および確認部材等を示す半断面図

【図１１】実施例２の確認部材の係合状態を示す側面図

【図１２】実施例２の確認部材の係合状態を示す背面図

【図１３】実施例２の確認部材の係合状態を示す断面図

【図１４】実施例２の確認部材の拡径状態を示す断面図

【図１５】実施例３としてのクイックコネクタの全体構成を示す半断面図

【図１６】実施例３の保持部材の構成を示す断面図

【図１７】実施例４の雌部材の構成を示す半断面図

【図１８】実施例４の雌部材の要部構成を示す平断面図

【図１９】実施例４の雌部材の要部構成を示す側断面図

【図２０】実施例４の雌部材の挿入開口端部の構成を示す背面図

【図２１】実施例４の雌部材の挿入開口端部の要部構成を示す部分背面図

【図２２】実施例４の雌部材の全体形状を示す斜視図

【図２３】実施例４の雌部材の挿入開口端部の形状を拡大して示す斜視図

【図２４】実施例４の保持部材の構成を示す側面図

【図２５】従来の第一タイプのクイックコネクタの全体構成を示す断面図

【図２６】従来の第一タイプの保持部材の構成を示す背面図

【図２７】従来の第一タイプの保持部材の構成を示す側断面図

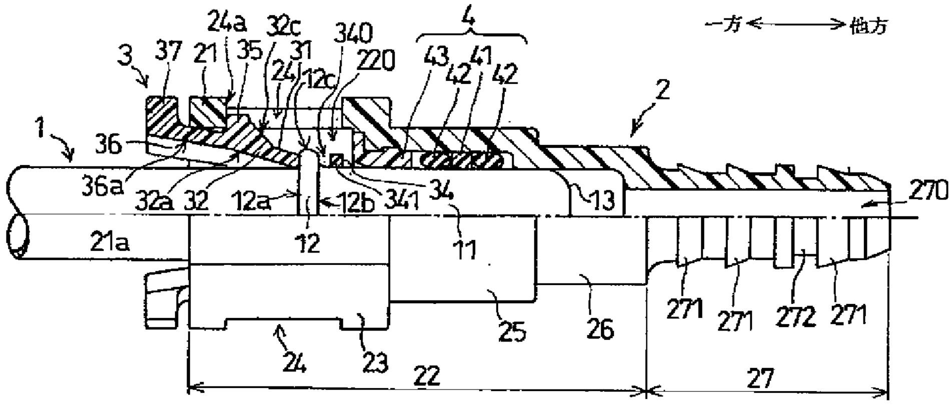
【図２８】従来の第二タイプのクイックコネクタの全体構成を示す半断面図

【図２９】従来の第二タイプの保持部材の形状を示す斜視図

【符号の説明】

１：雄部材
１１：挿入端部
１２：リング状突部
１２ａ：一端面　１２ｂ：他端面　１２ｃ：外周面
１３：先端
２：雌部材
２１：挿入開口端部　２１０：挿入孔
２１ａ：開口端面　２１ｂ：案内テーパ面　２１ｃ：案内斜面
２１１：規制突部
２１１ａ：規制端面　２１１ｂ：内側面　２１１ｃ：案内斜面
２２：収容部　２２０：収容空間
２３：大径部
２３ａ：外周面　２３ｂ：外側面
２３ｃ：内周面　２３ｄ：案内面
２３１：嵌合凸部　２３２：案内凹部
２４：窓部（第一係止部として）
２４ａ：係止面　２４ｂ：開口側面　２４ｃ：対向面
２５：中径部
２６：小径部
２７：ホース接続部　２７０：流路孔
２７１：段部　２７２：シール溝
３：保持部材
３１：本体部
３２：テーパ壁部
３２ａ：内周面　３２ｂ：他端面　３２ｃ：傾斜面
３３：連結部　３３０：欠損部
３４，３４’：保持部　３４０：開口窓　３４０’：溝
３４１：窓枠部　３４１ａ：内端面　３４１ｂ：先端面
３４２：支持部　３４２ａ：内接面
３５：第二係止部　３５ａ：一端面　３５ｂ：他端面
３６：操作アーム部　３６ａ：内側面
３７：操作端部
４：シール部材類
４１：リング部材　４２：Ｏリング　４３：ブッシュ
５：確認部材
５１：Ｃ字形状部
５２：係止突起部
５２ａ：係合面　５２ｂ：先端面　５２ｃ：摺接面
５３：取手部
Ｐ：第一の対称面　Ｑ：第二の対称面

【図1】



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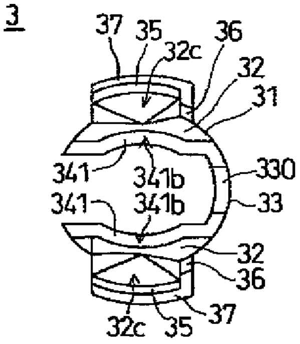

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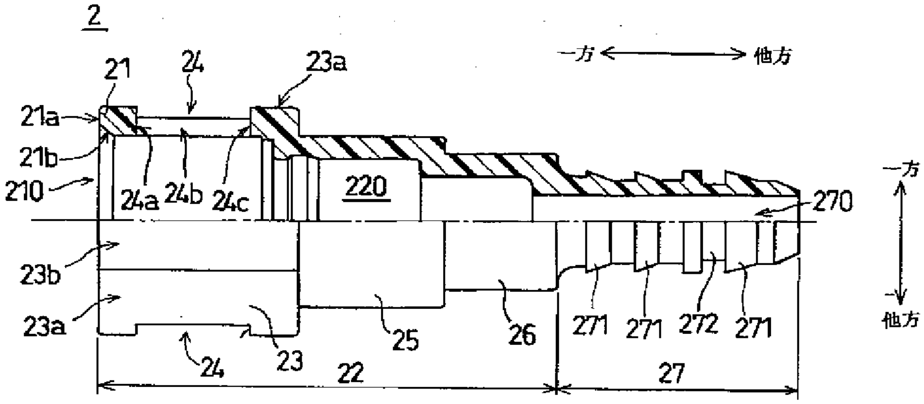

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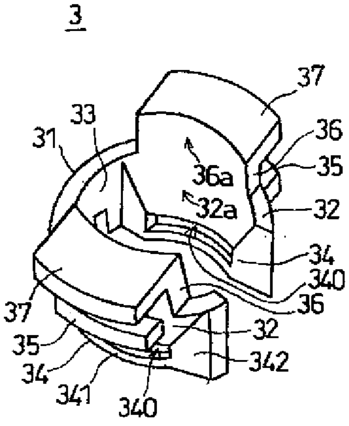

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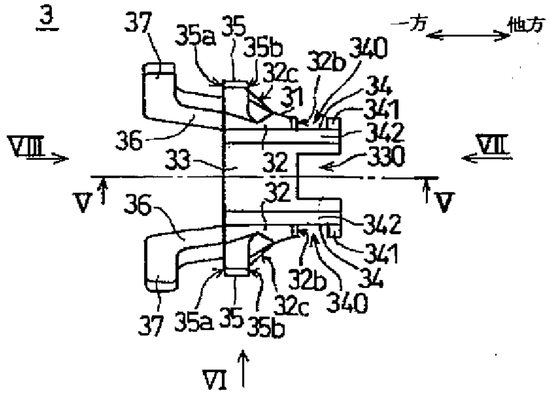

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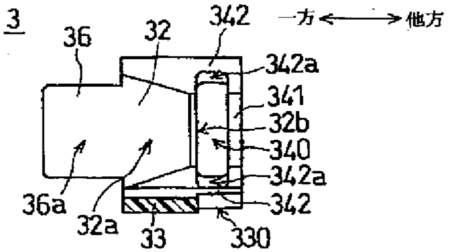

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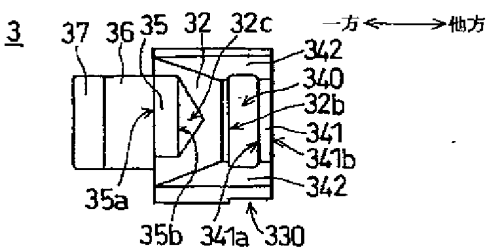

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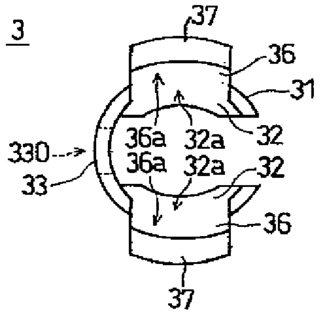

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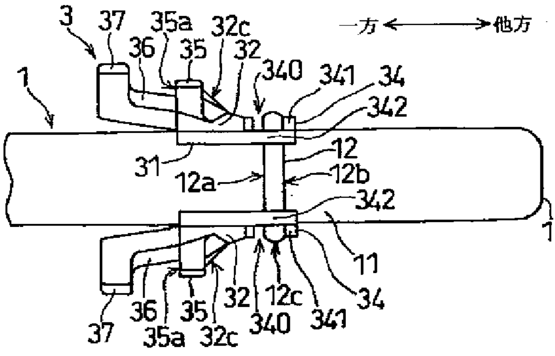

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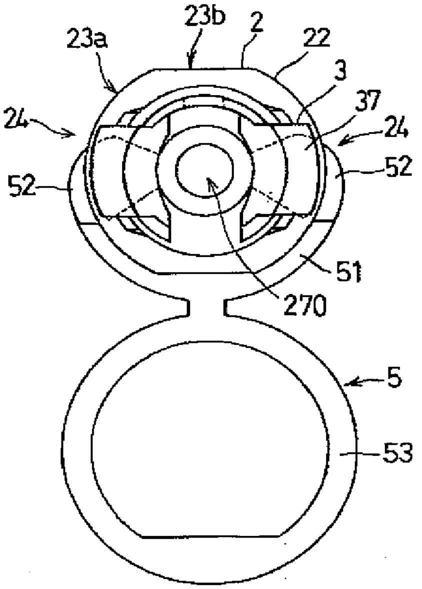

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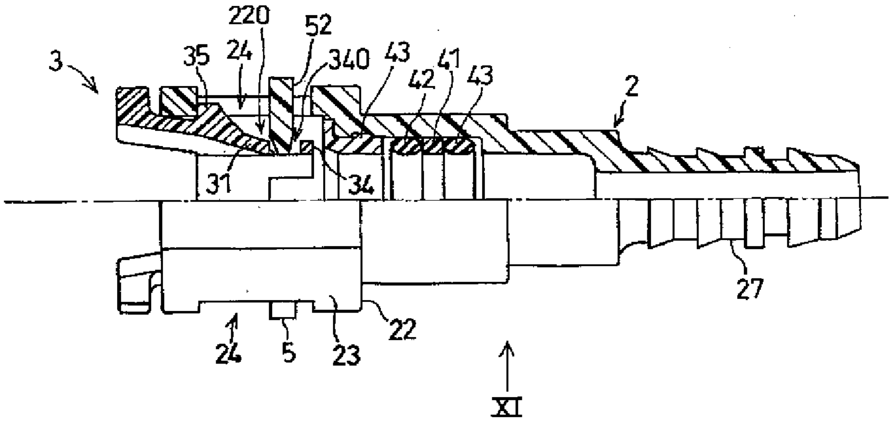

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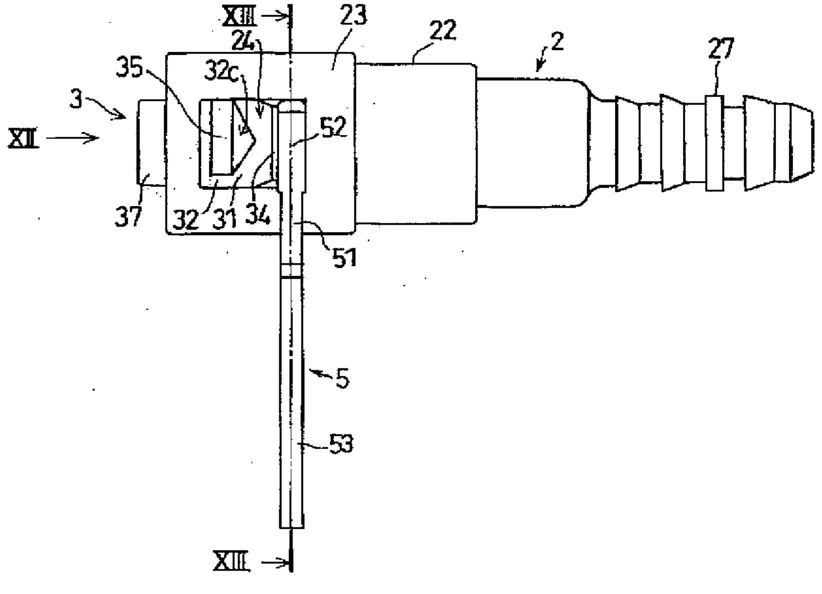

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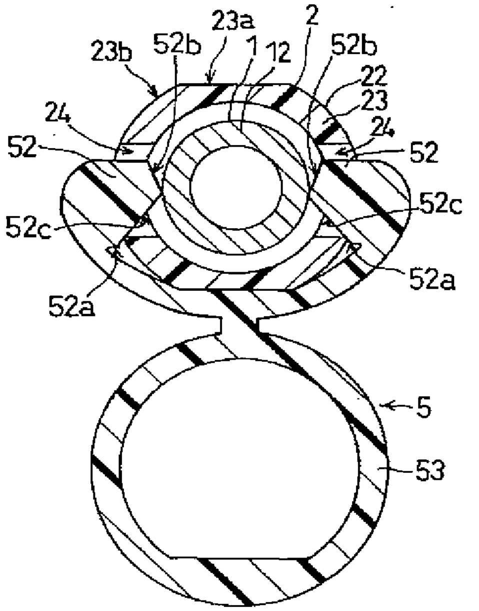

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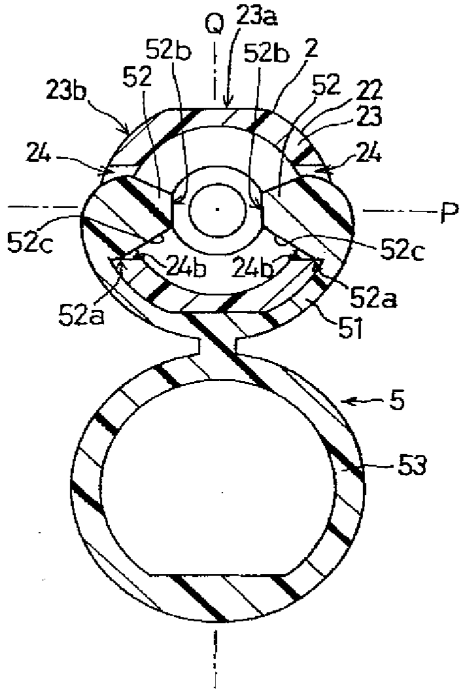

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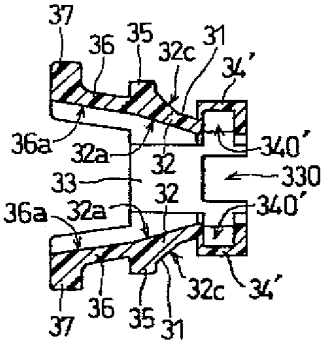

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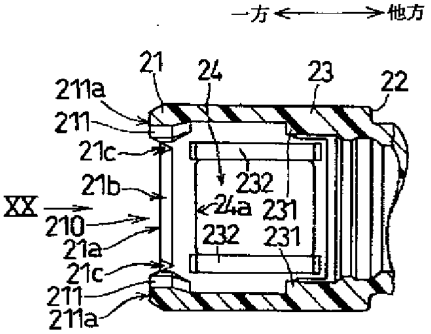

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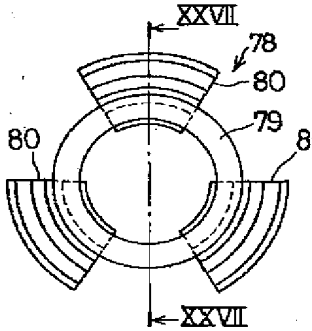

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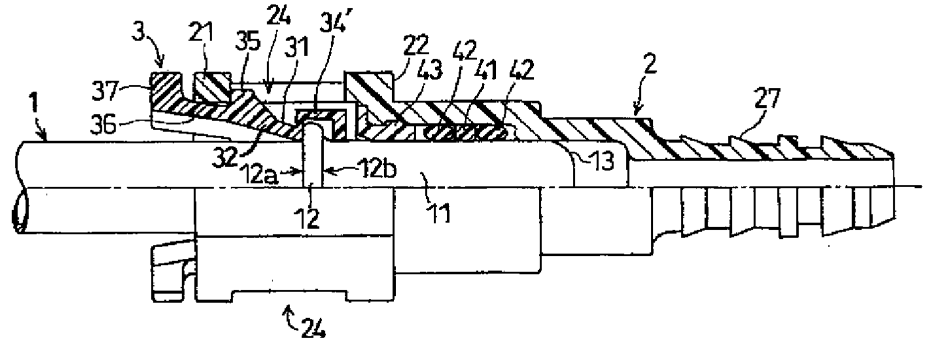

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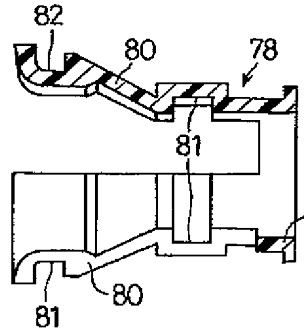

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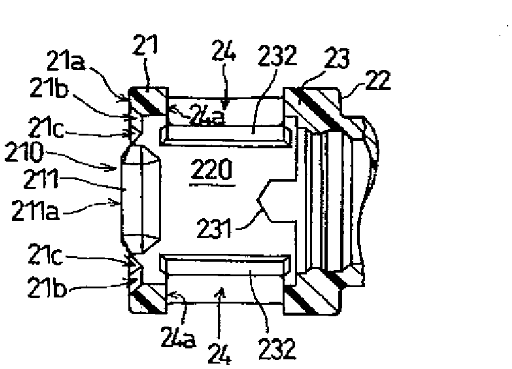

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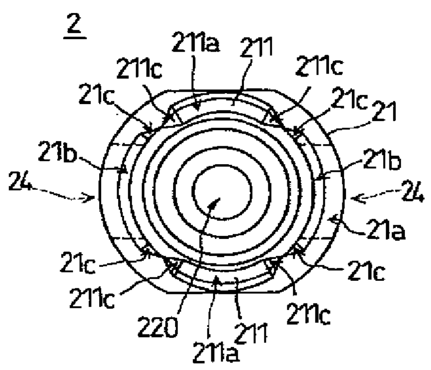

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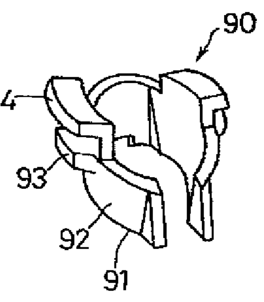

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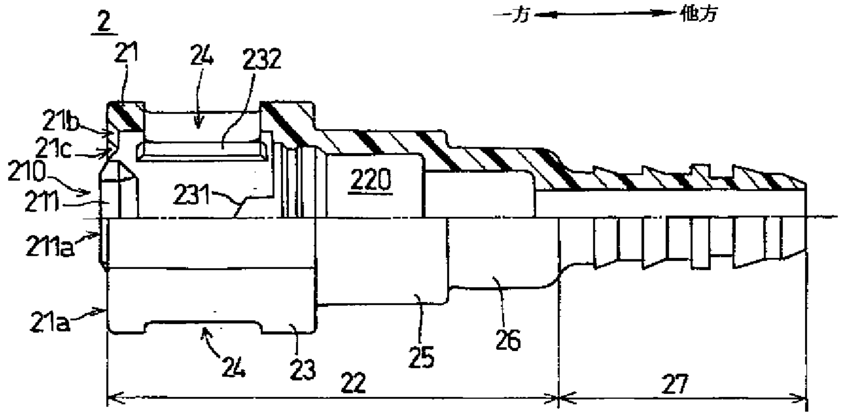

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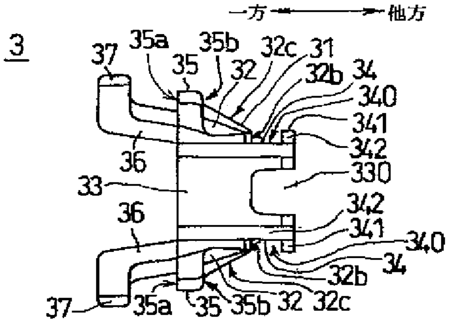

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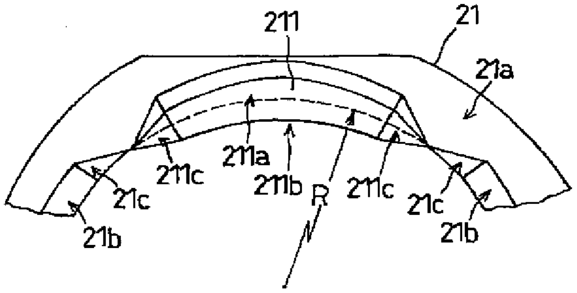

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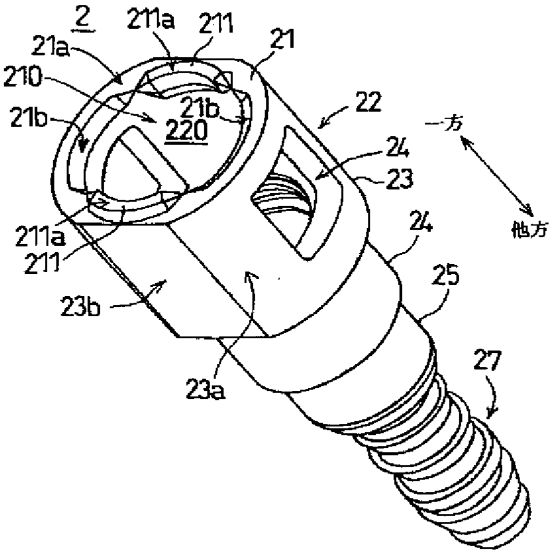

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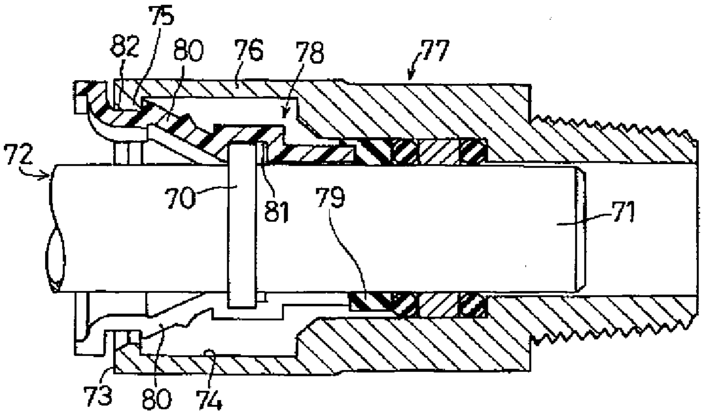

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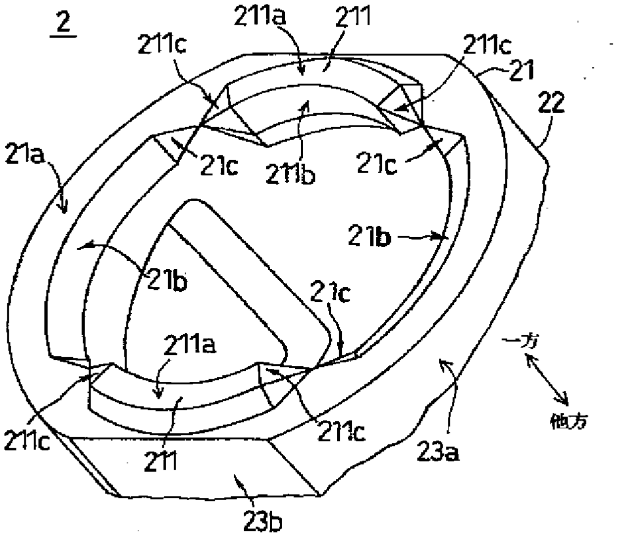
一方
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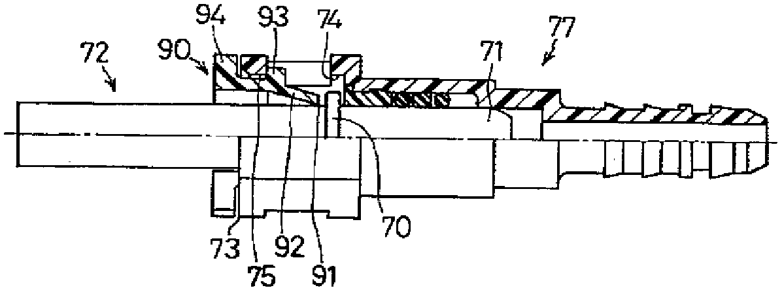

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 11-201355
(43)Date of publication of application : 30.07.1999

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(51)Int.Cl. F16L 37/12

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(21)Application number : 10-255662
(22)Date of filing : 09.09.1998

(71)Applicant : TOKAI RUBBER IND LTD
(72)Inventor : KODAMA TSUTOMU
ITO KIMIHIDE
TAKAYANAGI AKIRA

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(30)Priority
Priority number : 09308796 Priority date : 11.11.1997 Priority country : JP

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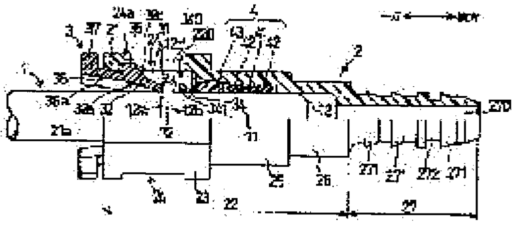
(54) QUICK CONNECTOR AND MEMBER FOR HOLDING THE CONNECTOR

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a quick connector that has an easily reusable holding member and that can be removed and disassembled without using a release tool and so on.

SOLUTION: A holding member 3 is provided between a ring shape projecting part 12 of a male member 1 and a fitting surface 24a of a window part 24 of a female member 2 to connect the male member 1 and the female member 2. When a diameter of the holding member 3 is reduced by interposing an operating end part 37 of the holding member 3 with fingers, a second fitting part 35 of the holding member 3 is released toward outside from the window part 24 of the female member 2, and the male member 1 and holding member 3 are easily pulled out from the female member 2. As the holding member 3 is holding the male member 1 fitting the ring shape projecting part 12 of the male member 1 in an opening window 340 of the holding part 34, the holding member 3 does not come off from the male member 1 even if it is pulled out from the female member 2. The holding member 3 hardly deforms and reusable many times as the male member 1 is taken out from an approximately C-shape opening end to the side after expanding a diameter of a main body part 31 of the holding member 3 with an approximately C-shape sectional area.



LEGAL STATUS

[Date of request for examination] 28.10.2002

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]	
[Patent number]	3718845
[Date of registration]	16.09.2005
[Number of appeal against examiner's decision of rejection]	
[Date of requesting appeal against examiner's decision of rejection]	
[Date of extinction of right]	

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3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] The male part material which has the insertion edge of the shape of an abbreviation pipe with the ring-like projected part which projects in the centrifugal direction established by separating predetermined distance from a tip, It has the hold section which has the insertion open end which carried out opening to one side of the direction of an axis, and the first stop section with the stop side which turns to another side of the direction of an axis, and extends in radial in a peripheral wall. The female member by which said insertion edge of said male part material is inserted in this hold section from this insertion open end, At least a part is inserted in said hold section from said insertion open end of said female member, and intervenes between said ring-like projected part of said male part material, and said stop side of this female member. It has the attachment component which makes this hold section of this female member equip with said insertion edge of this male part material inserted from this insertion open end. Said attachment component By elastic deformation with the attaching part which said ring-like projected part of said insertion edge of said male part material prepared in the taper wall whose diameter inner skin is reducing toward said another side, and this other-end section of this taper wall fits in, and holds this insertion edge, the cross-section abbreviation C typeface-like body section in which diameter expansion and diameter reduction are possible, The second stop section which is the heights which projected in the centrifugal direction from one [said] edge of said body section, and were formed in one with this body section, and engages with said first stop section, It has the actuation edge which projects from said insertion open end also at the time of **** to said hold section of a projection and said female member in this one side from one [said] edge of said body section. The quick connector characterized by having two or more actuation arm sections which are energized by the elastic force of this body section in the centrifugal direction at the time of diameter reduction of this body section, and which faced in opposite directions mutually.

[Claim 2] The lateral surface of said body section of said attachment component is a quick connector with the inclined plane which approaches an axis as it goes to said another side from said second stop section according to claim 1.

[Claim 3] It is the quick connector according to claim 1 said whose first stop section is a window part of the pair which countered mutually and carried out opening to said peripheral wall of said hold section and said whose stop side of said first stop section is a part of opening inside of said window part.

[Claim 4] Said attaching part of said attachment component is a quick connector according to claim 1 which has the opening aperture into which said a part of ring-like projected part of said male part material fits.

[Claim 5] Said hold section of said female member is a quick connector according to claim 4 which has the window part which carried out opening of said opening aperture of said attachment component to the location which it can keep seeing from an outside in a peripheral wall.

[Claim 6] Said body section of said attachment component is a quick connector according to claim 1 which has the deficit section formed from said another side between said attaching parts which adjoin a hoop direction mutually.

[Claim 7] Said female member is a quick connector according to claim 6 which has the fitting

heights which can fit into said deficit section of said attachment component in case only predetermined thickness is projected in the direction of centripetalism from the inner circle wall of said hold section and said attachment component is inserted in this hold section.
[Claim 8] Said female member has the regulation projected part projected by predetermined thickness in the direction of centripetalism in a location which is different in said first stop section and hoop direction among said insertion open ends. Said regulation projected part The quick connector according to claim 1 which is the projected part which prevents that this attachment component is inserted in said hold circles of said female member in contact with said second stop section of this attachment component when said attachment component attached in said male part material cannot be found in a proper angle-of-rotation location.
[Claim 9] It is the quick connector according to claim 8 which is the flat surface which said attachment component has the regulation flat surface formed in said another side of said second stop section by intersecting perpendicularly with the direction of an axis, and prevents that this attachment component is inserted in said hold circles of said female member in contact with the end face of said regulation projected part of said female member when said regulation flat surface does not have said attachment component attached in said male part material in a proper angle-of-rotation location.
[Claim 10] Said female member is a quick connector according to claim 1 which has the guidance taper side of beveling which follows the part corresponding to each aforementioned first stop section from the end face of this insertion open end to the inner circle wall of said hold section among said insertion open ends.
[Claim 11] Said female member is a quick connector according to claim 10 which has the guidance slant face of the pair which follows the both ends of each aforementioned guidance taper side from the end face of said insertion open end to each ****** taper side.
[Claim 12] The major diameter in which the hold section of said female member holds said ring-like projected part of said male part material, the body section of said attachment component, and the second stop section, The quick connector according to claim 1 in which a bore has a medium diameter portion holding the seal member of the shape of a ring which contacts inner skin and the peripheral face of said insertion edge of this male part material small, and the narrow diameter portion in which a bore is still smaller than this medium diameter portion, and said tip of this male part material is held rather than this major diameter.
[Claim 13] Said hold section of said female member has the window part which carried out opening to the peripheral wall, and this hold section is equipped from the periphery side of said hold section of said female member. The C typeface-like section whose diameter can be expanded by elastic deformation, It has the check member which has the stop height of the pair inserted in the method of the inside of radial from each aforementioned window part of this hold section at each aforementioned opening aperture of said attaching part of the projection aforementioned attachment component, respectively from the both ends of this C typeface-like section. Said check member is a quick connector according to claim 4 by which each aforementioned stop height is extruded in the centrifugal direction, and the diameter of said C typeface-like section is expanded by the peripheral face of said ring-like projected part of said male part material through said opening aperture of said attachment component when association with said male part material and said female member is completed.
[Claim 14] It has the hold section which has the insertion open end which carried out opening to one side of the direction of an axis, and the first stop section with the stop side which turns to another side of the direction of an axis, and extends in radial in a peripheral wall. The female member by which the insertion edge of the shape of an abbreviation pipe with the ring-like projected part which projects in the centrifugal direction established by separating predetermined distance from the tip of male part material is inserted in this hold section from this insertion open end, At least a part is inserted in said hold section from said insertion open end of said female member, and intervenes between said ring-like projected part of said male part material, and said stop side of this female member. It has the attachment component which makes this hold section of this female member equip with said insertion edge of this male part material inserted from this insertion open end. Said attachment component By elastic

deformation with the attaching part which said ring-like projected part of said insertion edge of said male part material prepared in the taper wall whose diameter inner skin is reducing toward said another side, and this other-end section of this taper wall fits in, and holds this insertion edge, the cross-section abbreviation C typeface-like body section in which diameter expansion and diameter reduction are possible, The second stop section which is the heights which projected in the centrifugal direction from one [said] edge of said body section, and were formed in one with this body section, and engages with said first stop section, It has the actuation edge which projects from said insertion open end also at the time of **** to said hold section of a projection and said female member in this one side from one [said] edge of said body section. The quick connector characterized by having the actuation arm section of the pair which is energized by the elastic force of this body section in the centrifugal direction at the time of diameter reduction of this body section, and which faced in opposite directions mutually.
[Claim 15] At least a part from the insertion open end of the female member which carried out opening to one side of the direction of an axis It is inserted in the hold section of this female member which has the first stop section with the stop side which turns to another side of the direction of an axis, and extends in radial in a peripheral wall. The ring-like projected part which projects in the centrifugal direction established in the pars intermedia of the insertion edge of the shape of an abbreviation pipe of the male part material ****(ed) by this hold section of this female member, It is the attachment component of a quick connector which makes this hold section of this female member equip with said insertion edge of this male part material that intervened between these stop sides of this female member, and was inserted from this insertion open end. The taper wall to which inner skin is reducing the diameter of said attachment component toward said another side, By elastic deformation with the attaching part which said ring-like projected part of said insertion edge of said male part material prepared in this other-end section of this taper wall fits in, and holds this insertion edge, the cross-section abbreviation C typeface-like body section in which diameter expansion and diameter reduction are possible, The second stop section which is the heights which projected in the centrifugal direction from one [said] edge of said body section, and were formed in one with this body section, and engages with said first stop section, It has the actuation edge which projects from said insertion open end also at the time of **** to said hold section of a projection and said female member in this one side from one [said] edge of said body section. The attachment component of the quick connector characterized by having the actuation arm section of the pair which is energized by the elastic force of this body section in the centrifugal direction at the time of diameter reduction of this body section, and which faced in opposite directions mutually.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention belongs to the technical field of a piping connection technique about the quick connector for piping which has the male part material and female member which are connected, in order to connect a hose, a pipe, etc. which transport various fluids.
[0002]
[Description of the Prior Art] (The first type) Conventionally, as a quick connector of the first type, as shown in drawing 25 - drawing 27 , the thing equipped with the male part material 72, the female member 77, and the attachment component 78 is indicated by U.S. Pat. No. 4,601,497.

[0003] That is, the male part material 72 is a tubed member with the insertion edge 71 where the ring-like projected part 70 which projects in the centrifugal direction was formed in predetermined distance partition ****** from the tip. On the other hand, the female member 77 equips the direction end side of an axis with the approximately cylindrical housing 76. Housing 76 has the insertion open end 73 in which the insertion edge 71 of the male part material 72 is inserted, the hold section 74 prepared in the method of the inside of the direction of an axis of the insertion open end 73, and the first stop section 75 prepared in the hold section 74. An attachment component 78 is a member which combines the male part material 72 which was inserted from the insertion open end 73 of the female member 77, was contained by the hold section 74 and inserted from the insertion open end 73, and the female member 77.
[0004] The attachment component 78 consists of the annular color section 79 which has the outer diameter of the insertion edge 71 of the male part material 72, and the bore of an abbreviation EQC, and the three legs 80 installed in the direction of an axis in one from the annular color section 79. Elastic deformation is possible for each leg 80 to the method of radial inside and outside within the hold section 74 of the female member 77. And each leg 80 has the stop crevice 81 which can be stopped to the ring-like projected part 70 of the male part material 72 inserted from the insertion open end 73 of the female member 77 in an inside side. Moreover, each leg 80 has the second stop section 82 which can be stopped in the first stop section 75 of the female member 77 in the external surface side.
[0005] Therefore, this first type of quick connector is connected by the following procedure. First, the male part material 72 is made to insert in an attachment component 78, carrying out elastic deformation of each leg 80 of an attachment component 78 to the method of the outside of radial by the ring-like projected part 70 of the male part material 72. Then, the ring-like projected part 70 of the male part material 72 fits into the stop crevice 81 of an attachment component 78, and is stopped, and it is ****. Next, if the attachment component 78 holding the male part material 72 is inserted in the female member 77, the second stop section 82 of an attachment component 78 will fit in, and will be stopped by the first stop section 75 of the female member 77. Thus, when an attachment component 78 intervenes between the male part material 72 and the female member 77, the male part material 72 and the female member 77 of each other are connected.
[0006] (The second type) In the attachment component 78 concerning said first type of quick

connector, in JP,7-71673,A, a configuration differs from an operation, and the quick connector of the second type equipped with the cross-section abbreviation C typeface-like attachment component is indicated again. That is, the quick connector of the second type consists of the male part material 72, the female member 77, an attachment component 90, and seal members, such as an O ring, as shown in drawing 28 . Furthermore, an attachment component 90 consists of the body section 92, the second stop section 93, and the actuation arm section 94, as shown in drawing 29 .
[0007] Hereafter, the configuration of an attachment component 90 is explained more to a detail. The body section 92 consists of a taper wall of the shape of a ring C made into the shape of a taper so that the diameter could be expanded by elastic deformation within the hold section 74 of the female member 77, it might take toward an other end side (right-hand side of drawing 28) from the direction end of an axis (left-hand side of drawing 28) and it might become a minor diameter. An attachment component 90 has the contact section 91 which stops with the ring-like projected part 70 of the male part material 72, and regulates the omission of the male part material 72 by the side of said direction end of an axis further at the time of association with the male part material 72 and the female member 77 in the small other end side of the path of the body section 92. The second stop section 93 is heights which it is formed in the large end side peripheral face of the path of the body section 92 in one, and are stopped in the first stop section 75 of the female member 77. The actuation arm section 94 is a control unit which solves a stop with the first stop section 75 and the second stop section 93 by being prepared in the large end side edge side of the path of the body section 92, and making the path small for the large end side of the path of the body section 92.
[0008] Therefore, this second type of quick connector is connected by the following procedure. First, the male part material 72 is inserted in an attachment component 90, the body section 92 of an attachment component 90 being made to expand the diameter by the ring-like projected part 70 of the male part material 72 by elastic deformation. Thereby, the ring-like projected part 70 of the male part material 72 and the contact section 91 of an attachment component 90 contact. Next, the actuation edge 71 and attachment component 90 of the male part material 72 are inserted in the female member 77 by pushing an attachment component 90. Then, the first stop section 75 of the female member 77 fits into the second stop section 93 of an attachment component 90, and an attachment component 90 is stopped by the female member 77. When an attachment component 90 intervenes between the ring-like projected part 72 of the male part material 72, and the first stop section 75 of the female member 77, it stops namely, escaping from the male part material 72 from the female member 7. In this way, the male part material 72 and the female member 77 of each other come to be connected by the attachment component 90.
[0009]
[Problem(s) to be Solved by the Invention] In (the first type) and time, in said first conventional type of quick connector, in separating the male part material 72 and the female member 77, elastic deformation of each leg 80 of an attachment component 78 is carried out to the method of the inside of radial, and it cancels a stop with first **** 75 of the female member 77, and the second stop section 82 of an attachment component 78. And the male part material 72 and the female member 77 are separable in this condition by drawing out the male part material 72 in the direction of an axis from the female member 77 with an attachment component 78.
[0010] Thus, after separating the male part material 72 and the female member 77, the insertion edge 71 of the male part material 72 is inserted in the annular color section 79 of an attachment component 78. Moreover, since the ring-like projected part 70 of the male part material 72 has fitted into the stop crevice 81 of an attachment component 78, the attachment component 78 holds the male part material 72. However, when removing the attachment component 78 held in this way at the male part material 72 from the male part material 72, in the condition of this as, an attachment component 78 cannot be drawn out in the direction of an axis, or the direction of an axial right angle from the male part material 72. So, after making each leg 80 of an attachment component 78 deform so that it may bend backward greatly to the method of the outside of radial and canceling a stop with the stop crevice 81 of an attachment component 78, and the

ring-like projected part 70 of the male part material 72, an attachment component 78 must be drawn out in the direction of an axis from the male part material 71. For this reason, the leg 80 of an attachment component 78 might carry out damage etc. in connection with the form very much, and reuse of removal of an attachment component 78 not being not only easy but the attachment component 78 was difficult.
[0011] In addition, a stop with the stop crevice 81 and the ring-like projected part 70 can be canceled by inserting the release implement prepared separately inside each leg 80 after separation with the male part material 72 and the female member 77, and carrying out elastic deformation of each leg 80 to the method of the outside of radial. It is possible to draw out an attachment component 78 in the direction of an axis from the male part material 72, without being accompanied by the serious form of the leg 80, if it carries out like this. It is the special tool which has a cylinder with a bore a little larger [this release implement] than male part material 72 outer diameters and an outer diameter in general equal to the outer diameter of the ring-like projected part 70 at a tip. However, preparing such a release implement in an actual site does not have few cases where it is difficult it to be not only troublesome, but to insert in a release implement the male part material 71 connected to piping etc. So, even if it uses a release implement, it is hard to say that it is easy to remove an attachment component 78 from the male part material 72.
[0012] That is, in such a quick connector of the first type, reuse of removal of an attachment component 78 not being not only easy but the attachment component 78 was difficult.
(The second type) On the other hand, in said second conventional type of quick connector, in order to separate the male part material 72 and the female member 77, it is performed by the following procedure. First, a stop with the second stop section 93 and the first stop section 75 of the female member 77 is canceled by pressing the actuation arm section 94 of an attachment component 90, and making the path small for the large end side of the path of the body section 92. this condition -- an attachment component 90 -- ** -- the male part material 72 and the female member 77 are separable the whole attachment component 90 by both drawing out the male part material 72 along the direction of an axis from the female member 77.
[0013] However, after separating the male part material 72 and the female member 77, as for the attachment component 90, the omission to the opposite side is not regulated at all to the male part material 72, as for the tip of the insertion edge 71. For this reason, the attachment component 90 drawn out with the male part material 72 from the female member 77 shifted from the tip of the insertion edge 71 to the opposite side greatly to the male part material 72, and there was a problem on which subsequent workability is reduced.
[0014] Moreover, if the male part material 72 is drawn out from the female member 77 as mentioned above in order to separate a quick connector, the attachment component 90 is not stopped by the male part material 72. So, the attachment component 90 may have slid down along with the male part material 77, and may have lost the attachment component 90. Since such a thing was what should be prevented to ** in the site where it not only makes reuse of an attachment component 90 difficult, but existence of a foreign matter poses a problem, careful cautions were needed for removal of a such second type quick connector.
[0015] (Technical problem of this invention) this invention has an attachment component with easy reuse there, and instruments, such as a release implement, are not used -- also coming out -- removal and decomposition make it the technical problem which should be solved to offer an easy quick connector.
[0016]
[Means for Solving the Problem] The male part material which has the insertion edge of the shape of an abbreviation pipe with the ring-like projected part which projects in the centrifugal direction established by the quick connector of this invention separating predetermined distance from a tip, (Configuration) It has the hold section which has the insertion open end which carried out opening to one side of the direction of an axis, and the first stop section with the stop side which turns to another side of the direction of an axis, and extends in radial in a peripheral wall. The female member by which said insertion edge of said male part material is inserted in this hold section from this insertion open end, At least a part is inserted in said hold section from

said insertion open end of said female member, and intervenes between said ring-like projected part of said male part material, and said stop side of this female member. It has the attachment component which makes this hold section of this female member equip with said insertion edge of this male part material inserted from this insertion open end. Said attachment component By elastic deformation with the attaching part which said ring-like projected part of said insertion edge of said male part material prepared in the taper wall whose diameter inner skin is reducing toward said another side, and this other-end section of this taper wall fits in, and holds this insertion edge, the cross-section abbreviation C typeface-like body section in which diameter expansion and diameter reduction are possible, The second stop section which is the heights which projected in the centrifugal direction from one [said] edge of said body section, and were formed in one with this body section, and engages with said first stop section, It has the actuation edge which projects from said insertion open end also at the time of **** to said hold section of a projection and said female member in this one side from one [said] edge of said body section. It is characterized by having two or more actuation arm sections which are energized by the elastic force of this body section in the centrifugal direction at the time of diameter reduction of this body section and which faced in opposite directions mutually.

[0017] In addition, since it is shipped without male part material from works in many cases, also suppose that it is it the quick connector of this invention to have a female member and an attachment component. Male part material is inserted in an assembly site, and this quick connector achieves the connect function of piping. Moreover, since the attachment component used for the above-mentioned quick connector is very rich in the description, it presupposes that it is also the attachment component of a quick connector this invention article.

[0018] (The operation effectiveness) The quick connector of this invention has two kinds of operations with connection and removal. First, connection of the quick connector of this invention can be made by all among two kinds of procedures as follows. The first handshaking is in the condition that the insertion edge of male part material was held by the attachment component, and male part material and an attachment component were assembled, and is a procedure of inserting the insertion edge of male part material in the hold section of a female member the whole attachment component, and making the second stop section of an attachment component engaging with the first stop section of a female member.

[0019] In this procedure, first, in case the insertion edge of male part material is made to hold to an attachment component, an axis is about doubled from one edge of an attachment component, and male part material is inserted from a tip. Then, it is inserted in another side of the body section, the ring-like projected part prepared in the insertion edge of male part material contacting the inner skin of the taper wall of an attachment component by the peripheral face, and extending the body section of the shape of a cross-section abbreviation C typeface of an attachment component. If male part material is furthermore deeply inserted in an attachment component and the ring-like projected part of male part material reaches the attaching part of an attachment component, a ring-like projected part fits into an attaching part automatically, the insertion edge of male part material will be held at the body section of an attachment component, and male part material and an attachment component will be assembled.

[0020] If the location of the hoop direction of the first stop section of a female member and the second stop section of an attachment component doubles, the insertion edge of male part material is inserted in the hold section of a female member together with an attachment component and the predetermined immersion depth is reached after an appropriate time, the first stop section and the second stop section will be engaged mutually. Consequently, the body section and the second stop section of an attachment component intervene between the stop sides of the ring-like projected part of male part material, and the first stop section of a female member, male part material stops escaping from a female member, and connection between male part material and a female member completes it.

[0021] The second handshaking inserts an attachment component in the hold section of a female member, makes the second stop section of an attachment component engage with the first stop section of a female member, makes an attachment component hold in the hold section of a female member, and is a procedure which inserts the insertion edge of male part material in the hold section and the attachment component of a female member after an appropriate time. In this procedure, if the location of the hoop direction of the first stop section of a female member and the second stop section of an attachment component doubles, an attachment component is first inserted in the hold section of a female member and the predetermined immersion depth is reached, the first stop section and the second stop section will be engaged mutually. Consequently, an attachment component is held at the hold section of a female member, without an attachment component falling out from the hold section of a female member. Here, the actuation edge of the actuation arm section of an attachment component is maintained at the condition of having projected from the insertion open end of a female member to one side. Moreover, the attachment component is held at the hold section of a female member so that an attachment component may not be inserted in the interior of a female member still more deeply.

[0022] After an appropriate time, an axis is doubled about and male part material is inserted from a tip from one edge of a female member and an attachment component. Then, it is inserted in another side of the body section, the ring-like projected part prepared in the insertion edge of male part material contacting the inner skin of the taper wall of an attachment component by the peripheral face, and extending the body section of the shape of a cross-section abbreviation C typeface of an attachment component. If male part material is furthermore deeply inserted in an attachment component and the ring-like projected part of male part material reaches the attaching part of an attachment component, a ring-like projected part will fit into an attaching part automatically, and the insertion edge of male part material will be held at the body section of an attachment component. Then, the body section and the second stop section of an attachment component come to intervene between the stop sides of the ring-like projected part of male part material, and the first stop section of a female member, male part material stops escaping from a female member, and connection between male part material and a female member completes it.

[0023] So, connection of the quick connector of this invention is very easy. Moreover, since the attachment component is held before connection at a female member or male part material, dropping an attachment component in a work site is prevented. If one side is being fixed not only among it but among male part material and female members, it is also possible to manage handshaking of a quick connector single hand.

[0024] On the other hand, removal and decomposition of this invention of a quick connector are performed as follows. That is, in the quick connector of this invention, it has the second stop section which is the heights to which an attachment component has a taper wall and an attaching part, and engages with the cross-section abbreviation C typeface-like body section in which elastic deformation is possible, and the first stop section of a female member, and the actuation arm section which the actuation edge has projected from the female member. It is separated from the peripheral face of male part material here also in the condition of having been inserted in the hold section of a female member since the actuation arm section was energized outside by the elastic force of the body section, and the taper wall of the body section is also separated from the peripheral face of male part material in connection with this. So, if the actuation edge of the actuation arm section is pushed in the direction of centripetalism and contracted by a fingertip etc., the diameter of the taper wall of the body section will also be reduced in the direction of centripetalism. Since the second stop section separates in the direction of centripetalism from the first stop section of a female member with diameter reduction of a taper wall, if male part material is pulled, male part material and an attachment component can be removed from a female member.

[0025] Since the ring-like projected part of male part material has fitted into the attaching part of an attachment component in that case, the attachment component is maintaining the condition of having engaged with the insertion edge of male part material, and having been assembled by male part material and one. So, even if it draws out male part material and an attachment component from a female member, an attachment component does not drop out of male part material carelessly. What is necessary is just to pull an attachment component to the method of the outside of the direction of an axial right angle so that the insertion edge of male part material may come out from opening of the cross-section abbreviation C typeface-like body

section in order to decompose male part material and an attachment component and to remove an attachment component from male part material. In that case, the body section of an attachment component expands only the diameter of the part which can pass the ring-like projected part of male part material, a C typeface-like cross section just needs to spread opening of the cross-section abbreviation C typeface-like body section, and the serious form of an attachment component is avoided. So, removal of the attachment component from male part material is easy, and also in case an attachment component is removed from male part material, un-arranging [which an attachment component damages according to a form very much] is prevented. Moreover, also when male part material is being fixed and that is not [not to mention] right, a worker can remove an attachment component from male part material single hand, and removal from the male part material of an attachment component is very easy.
[0026] Therefore, reuse of an attachment component is not only easy, but according to the quick connector of this invention, without using instruments, such as a release implement, it is effective in removal and decomposition being easy.
[0027]
[Embodiment of the Invention] In the quick connector of the above this invention, an attachment component can really be formed as a shaping member by deformable resin etc. with proper elasticity. The attaching part of an attachment component may be a part with the slot into which opening is carried out toward the inside and the ring-like projected part of male part material fits, and may be a part with the opening aperture into which it penetrates from a medial surface to the lateral surface, and the ring-like projected part of male part material fits. such a slot or an opening aperture does not need to fit in in the direction of an axis exactly to the ring-like projected part of male part material, and is large -- it may loosen, and you may insert in and come out. on the other hand, although it is desirable to have fitted into radial exactly to the ring-like projected part of male part material as for such a slot or an opening aperture, there is nothing, and the need loosens, it may be inserted in and may not necessarily come out of it.
[0028] Moreover, although the actuation arm section of an attachment component has the actuation edge which projects from the insertion open end of a female member also where a quick connector is connected, the actuation edge of being projected and formed in the centrifugal direction is good [the section]. If it carries out like this, in case a quick connector will be removed, a worker gathers an actuation edge by a fingertip etc., it becomes that it is easy to make the diameter of an attachment component reduce, and workability improves. In addition, as for the actuation arm section of an attachment component, it is most desirable on actuation that the pair which faced in opposite directions mutually is equipped. It is because a worker only holds the point of the actuation arm section by the thumb and the index finger and can remove a quick connector, if the actuation arm section is a pair.
[0029] Moreover, comparatively, if a female member is a rigid high ingredient, it can really be formed as a shaping member from resin, a casting metal, etc. The first stop section with the stop side of a female member may be a slot with the vertical plane as a stop side formed in the inner skin of the hold section, or may be a window part which penetrates the peripheral wall of the hold section and has an opening inside as a stop side. In addition, in order to secure watertightness and airtightness between the approximately cylindrical insertion edges of male part material, it is good for the hold section of a female member to hold seal members, such as an O ring. Moreover, in order not to insert male part material in a female member beyond the need, a female member is in addition good to have the color member which had this contact side with the contact side where the other-end side of the attaching part of an attachment component contacts. If it carries out like this, since a part of attaching part of an attachment component will be pinched between the other-end side of the ring-like projected part of male part material, and a female member, it is certainly regulated by the range where the immersion depth of male part material is proper.
[0030] In addition, as long as male part material is an ingredient with sufficient rigid reinforcement for the purpose of use, chemical stability, and thermal resistance, it may be formed from metallic materials, such as stainless steel, and may be formed from nonmetal materials, such as resin. As for the quick connector of the above this invention, it is desirable to

carry out with the gestalt of the following configurations.
[0031] First, the lateral surface of said body section of said attachment component is good suddenly also in the inclined plane approaching an axis as it goes to said another side from said second stop section. Conversely, if it says, this inclined plane will be lateral surface which spreads outside gradually until it results [from one side of the attaching part of an attachment component] in the second stop section. A level difference may be between this inclined plane and the second stop section, and you may not be in it. With this configuration, in case an attachment component is inserted in the hold section of a female member, the inclined plane of an attachment component contacts the inner circumference edge of the insertion open end of a female member, and the diameter of the body section of an attachment component is reduced as an attachment component is inserted in a female member. So, according to this configuration, it is effective in the activity which inserts an attachment component in the hold section of a female member coming to be done smoothly.
[0032] Moreover, said first stop section is a window part of the pair which countered mutually and carried out opening to said peripheral wall of said hold section, and said stop side of said first stop section is good in it being a part of opening inside of said window part. With this configuration, since signs that an attachment component is inserted in the hold section of a female member, and the second stop section of an attachment component engages with the first stop section of a female member can be seen from an outside through the window part of a female member, they can inspect visually engagement in the first stop section and the second stop section. Therefore, according to this configuration, since engagement to a female member and an attachment component is checked certainly, un-arranging [to which insertion to the female member of an attachment component is not shallow, or the location of a hoop direction is not proper, and engagement to an attachment component and a female member becomes imperfect] is prevented. Namely, the hold section of a female member is more certainly equipped with an attachment component, and it is effective in connection of a quick connector becoming more certain.
[0033] Moreover, said attaching part of said attachment component is good to have the opening aperture into which said a part of ring-like projected part of said male part material fits. With this configuration, in case an attachment component is attached to male part material, it can inspect visually that the ring-like projected part of male part material fitted into the attaching part of an attachment component. So, since according to this configuration the attaching part of an attachment component can insert an attachment component and an insertion edge in a female member where the insertion edge of male part material is held certainly, it is effective in connection of a quick connector becoming more certain.
[0034] Said hold section of said female member is still better in addition to have the window part which carried out opening of said opening aperture of said attachment component to the location which it can keep seeing from an outside in a peripheral wall here. With this configuration, after the ring-like projected part of male part material has fitted into the opening aperture of an attachment component, it can inspect visually that the insertion edge and attachment component of male part material are inserted in the hold section of a female member through the window part of the hold section. So, according to this configuration, even if it connects a quick connector by any among the above-mentioned handshaking, it is effective in connection of a quick connector becoming much more certain.
[0035] Moreover, said body section of said attachment component is good to have the deficit section formed from said another side between said attaching parts which adjoin a hoop direction mutually. With this configuration, since the deficit section is formed in the middle of the hoop direction of a cross-section abbreviation C typeface-like attachment component, the rigidity of the body section of an attachment component falls and deformation of an attachment component becomes easy. That is, when attaching an attachment component in male part material or removing it, or in case it inserts in the hold section of a female member the insertion edge of the male part material held at the attachment component or draws out conversely, an attachment component deforms easily. In addition, although not only diameter reduction and diameter expansion of the body section but the bending deformation which is not the symmetry

of revolution is included in deformation of an attachment component, especially if the deficit section is in an attachment component, this bending deformation will become easy. So, according to this configuration, the force required for each activity with the assembly of a quick connector and connection, removal, and decomposition decreases, and it is effective in each activity becoming still easier.

[0036] Said female member is still better to have the fitting heights which can fit into said deficit section of said attachment component here, in case only predetermined thickness is projected in the direction of centripetalism from the inner circle wall of said hold section and said attachment component is inserted in this hold section. With this configuration, since fitting heights have projected from the inner circle wall of the hold section, unless fitting heights fit into either among the deficit section of an attachment component, or C typeface cross-section opening, the attachment component holding male part material is not inserted in the hold section of a female member deeply enough. That is, if fitting heights are formed in the proper location among the hold sections of a female member, the attachment component holding male part material will not be inserted in a female member deeply enough in the angle-of-rotation location which is not proper. Consequently, a worker understands easily that the angle-of-rotation location of an attachment component is unsuitable forward, and an attachment component is rotated to a proper angle-of-rotation location. So, according to this configuration, insertion to the female member of the attachment component in an un-proper angle-of-rotation location is prevented, and it is effective in connection of a quick connector becoming much more certain.

[0037] Moreover, said female member is good for a location which is different in said first stop section and hoop direction among said insertion open ends to have the regulation projected part projected by predetermined thickness in the direction of centripetalism. Here, said regulation projected part is a projected part which prevents that this attachment component is inserted in said hold circles of said female member in contact with said second stop section of this attachment component, when said attachment component attached in said male part material cannot be found in a proper angle-of-rotation location. With this configuration, in case the attachment component holding male part material is inserted in the insertion open end of a female member, when there is no attachment component in a proper angle-of-rotation location, the second stop section projected on the outside of an attachment component cannot enter inside the regulation projected part of a female member. Then, even if a worker is going to stuff male part material into a female member, the second stop section does not enter into the insertion open end of a female member, but an attachment component can insert male part material and an attachment component even in the clearly inadequate depth at a female member. Consequently, since it becomes clear that the angle-of-rotation location of an attachment component is not proper to a female member, a worker makes a hoop direction rotate an attachment component, and does not get a proper angle-of-rotation location fake colander. So, it is effective in an attachment component not being inserted in a female member by this configuration, either, and connection of a quick connector becoming more certain by it in an un-proper angle-of-rotation location.

[0038] Said attachment component is still better to have the regulation flat surface formed in said another side of said second stop section by intersecting perpendicularly with the direction of an axis here. Here, said regulation flat surface is a flat surface which prevents that this attachment component is inserted in said hold circles of said female member in contact with the end face of said regulation projected part of said female member, when said attachment component attached in said male part material cannot be found in a proper angle-of-rotation location. With this configuration, in case the attachment component holding male part material is inserted in the insertion open end of a female member, when there is no attachment component in a proper angle-of-rotation location, the regulation flat surface of the second stop section projected on the outside of an attachment component contacts the end face of the regulation projected part of a female member. Then, even if a worker is going to stuff male part material into a female member, the second stop section does not enter into the insertion open end of a female member, but an attachment component can insert male part material and an attachment component even in the depth which the second stop section of an attachment component exposed at a female member. Consequently, since it is clear that the angle-of-rotation location of an attachment component is not proper to a female member, a worker makes a hoop direction rotate an attachment component, and does not get a proper angle-of-rotation location fake colander. So, it is effective in an attachment component not being inserted in a female member by this configuration, either, and connection of a quick connector becoming more certain by it in an un-proper angle-of-rotation location.

[0039] Moreover, said female member is good to have the guidance taper side of beveling which follows the part corresponding to each aforementioned first stop section from the end face of this insertion open end to the inner circle wall of said hold section among said insertion open ends. With this configuration, contrary to the above-mentioned configuration, when the second stop section of an attachment component comes to the location of the hoop direction corresponding to the first stop section of a female member, the heights of the second stop section of an attachment component **** to the guidance taper side formed in the insertion open end of a female member. That is, the second stop section of an attachment component is guided in slide contact with the guidance taper side of a female member, displacing in response to press in the direction of centripetalism, is smoothly inserted in the hold section of a female member, and comes to engage with the first stop section of a female member. To a female member, as for the operation which makes such insertion smooth, the angle-of-rotation location of an attachment component is demonstrated, only when proper. So, according to this configuration, it is effective in an attachment component becoming is easy to be inserted in a female member, and connection of a quick connector becoming more certain in a proper angle-of-rotation location.

[0040] Said female member is still better to have the guidance slant face of the pair which follows the both ends of each aforementioned guidance taper side from the end face of said insertion open end to each ****** taper side here. With this configuration, if the second stop section of an attachment component is extent which has shifted from the proper angle-of-rotation location for a while, while the corner of the second stop section of an attachment component ****s on the guidance slant face of a female member, an attachment component will be inserted in a female member. That is, the second stop section of an attachment component ****s on the guidance slant face of a female member, and an attachment component is automatically rotated to a more proper angle-of-rotation location as an attachment component is inserted in a female member. Consequently, by the time the second stop section of an attachment component is inserted in the hold section of a female member, an attachment component will finish rotating in a proper angle-of-rotation location to a female member, and the second stop section of an attachment component comes to engage with the first stop section of a female member proper. So, according to this configuration, it is effective in connection of a quick connector becoming easier.

[0041] In addition, the above-mentioned regulation projected part of a female member has extended by predetermined width of face in the hoop direction, and this configuration becomes much more effective by adding a little devices, when a regulation projected part has a regulation end face parallel to this end face projected from the end face of an insertion open end. That is, if the guidance slant face is continuously formed until it reaches [from a homonomy system end face] said guidance taper side, connection of a quick connector will become still easier. Because, what is necessary is just for a worker to make a hoop direction rotate a little attachment component, and to shift a little second stop section of an attachment component from the regulation projected part and its regulation end face of a female member, when the attachment component holding male part material is in an un-proper angle-of-rotation location to a female member. Then, it is because an attachment component is guided on the guidance slant face of a female member, and is automatically settled in the angle-of-rotation location of normal and the second stop section of an attachment component comes to engage with the first stop section of a female member as an attachment component is inserted.

[0042] Moreover, the major diameter in which the hold section of said female member holds said ring-like projected part of said male part material, the body section of said attachment component, and the second stop section, It is better than this major diameter suddenly in the medium diameter portion holding the seal member of the shape of a ring to which a bore contacts inner skin and the peripheral face of said insertion edge of this male part material small, and the narrow diameter portion in which a bore is still smaller than this medium diameter portion, and said tip of this male part material is held. With this configuration, since the tip of male part material is held in the narrow diameter portion of a female member, the posture of male part material is stabilized to a female member, between male part material and female members is not shaky, and connection of a quick connector is stabilized further. Moreover, since the ring-like seal member is pinched between the peripheral face of the insertion edge of male part material, and the inner skin of the medium diameter portion of a female member, high watertightness and high airtightness are acquired between male part material and a female member. Consequently, it is prevented effectively that the fluid which circulates the inside of a quick connector begins to leak outside. So, according to this configuration, connection of a quick connector is stabilized further and it is effective in the airtightness of a quick connector and fluid-tight nature improving.

[0043] Said hold section of said female member has the window part which carried out opening to the peripheral wall. Moreover, a quick connector This hold section is equipped from the periphery side of said hold section of said female member. The C typeface-like section whose diameter can be expanded by elastic deformation, It is good to have the check member which has the stop height of the pair inserted in the method of the inside of radial from each aforementioned window part of this hold section at each aforementioned opening aperture of said attaching part of the projection aforementioned attachment component, respectively from the both ends of this C typeface-like section. Here, said check member is a member by which each aforementioned stop height is extruded in the centrifugal direction, and the diameter of said C typeface-like section is expanded by the peripheral face of said ring-like projected part of said male part material through said opening aperture of said attachment component, when association with said male part material and said female member is completed. That is, in the condition that an attachment component is inserted in a female member and the first stop section and the second stop section are being engaged mutually, the stop height of the pair of a check member is inserted in the opening aperture of an attachment component through the window part of a female member. In this condition, the check member is engaging with the window part of a female member, and even if a check member is pulled by radial, it does not separate from a female member. However, if the insertion edge of male part material is inserted proper into a female member and an attachment component and the ring-like projected part of male part material is held at the opening aperture of an attachment component, a ring-like projected part will extrude a stop height outside in contact with the tip of the stop height of a check member. Consequently, the diameter of the C typeface-like section of a check member is expanded, and engagement to the C typeface-like section and the window part of a female member solves it, and if a check member is pulled by radial, it will come to separate from it from a female member. That is, a worker has that pull a check member and a check member separates from a female member after inserting male part material in a female member and an attachment component and connecting a quick connector, it cannot inspect visually but ** can also check that the quick connector is connected proper. So, since it is checked that the quick connector has been connected without visual inspection proper also when it must work by groping in the part into which various facilities extended far back according to this configuration, it is effective in the dependability of connection of the quick connector by groping improving.

[0044]

[Example] Hereafter, the example of the quick connector of this invention is explained to a detail, referring to a drawing.

[Example 1]

(Configuration of an example 1) The example 1 of a quick connector is equipped with the seal members 4 which carry out the seal of between the male part material 1, the female member 2 in which the male part material 1 is inserted, the attachment component 3 fixed so that the male part material 1 may not escape from the female member 2, and the male part material 1 and the female members 2 as shown in drawing 1 .

[0045] First, the male part material 1 has the insertion edge 11 of the shape of an abbreviation pipe with the ring-like projected part 12 which projects in the centrifugal direction established by separating predetermined distance from a tip 13. The male part material 1 is really which consists of a pipe made from mild steel a member, and the ring-like projected part 12 is formed of plastic working. Moreover, spinning of the tip 13 of the male part material 1 is carried out so that an R may be formed in a peripheral face, and it is easy to insert it in the female member 2. In addition, the male part material 1 is making the symmetry-of-revolution form the circumference of an axis.

[0046] Next, the insertion edge 11 of the male part material 1 is the approximately cylindrical member inserted in the hold section 22 from the insertion open end 21, and the female member 2 is an one cast made of glass fiber strengthening Nylon. That is, the female member 2 is equipped with the hold section 22 of an abbreviation bell shape which has the insertion open end 21 which carried out opening to one side of the direction of an axis, and the first stop section with stop side 24a which turns to another side of the direction of an axis, and extends in radial in a peripheral wall as shown in drawing 2 . The window part 24 of the pair which countered mutually and carried out opening to the peripheral wall of the hold section 22 as the first stop section is formed, and stop side 24a of the first stop section is a part of opening inside of a window part 24. Moreover, the female member 2 has guidance taper side 21b of beveling which also follows the part corresponding to the window part 24 as the first stop section from opening end-face 21a of the insertion open end 21 to the inner circle wall of the hold section 22 among the insertion open ends 21.

[0047] If it explains in more detail, the female member 2 is roughly divided and consists of an above-mentioned insertion open end 21 and the hold section 22, and a hose connection 27 inserted and connected to a tube or a hose. The insertion open end 21 has opening end-face 21a and guidance taper side 21b, and the insertion hole 210 with which the insertion edge 11 and attachment component 3 of the male part material 1 are inserted is carrying out opening to the axial center section of the insertion open end 21. From opening end-face 21a of the insertion open end 21, guidance taper side 21b of beveling which continues to the inner circle wall of the hold section 22 is formed in the perimeter, and makes easy insertion in the hold section 22 of the male part material 1 and an attachment component 3.

[0048] The hold section 22 consists of the major diameter 23 in which the window part 24 as the first stop section is formed, a medium diameter portion 25 (refer to drawing 1) in which the seal members 4 of O ring 41 grade are held, and a narrow diameter portion 26 where the tip 13 of the male part material 1 is inserted. As the first stop section, the window part 24 with rectangular opening of a pair carries out [each-other] opposite, and is formed in the major diameter 23. One opening inside of a window part 24 is stop side 24a which turns to another side of the direction of an axis, and extends in radial. The opening inside of a window part 24 consists of stop side 24a, opposed face 24c which has countered stop side 24a, and opening side-face 24b of the pair which counters mutually and forms the both-sides side of a hoop direction.

[0049] Here, as again shown in drawing 1 , the hold section 22 of the female member 2 consists of a major diameter 23, a medium diameter portion 25, and a narrow diameter portion 26. A major diameter 23 is a part which holds the ring-like projected part 12 of the male part material 1, the body section 31 of an attachment component 3, and the second stop section 35, and not only a bore but its outer diameter is the largest. A medium diameter portion 25 has a bore and an outer diameter smaller than a major diameter 23, and is a part holding the seal members 4 of the shape of a ring which contacts inner skin and the peripheral face of the insertion edge 11 of the male part material 1. A narrow diameter portion 26 has a bore and an outer diameter still smaller than a medium diameter portion 25, and is a part which holds the tip 13 of the male part material 1.

[0050] Then, since the tip 13 of the male part material 1 is held in the narrow diameter portion 26 of the female member 2, the posture of the male part material 1 is stabilized to the female member 2, between the male part material 1 and the female members 2 is not shaky, and connection of the quick connector of this example is stabilized further. Moreover, since the ring-like seal members 4 are pinched between the peripheral face of the insertion edge 11 of the male part material 1, and the inner skin of the medium diameter portion 25 of the female member 2, high watertightness and high airtightness are acquired between the male part material 1 and the female member 2. Consequently, it is prevented effectively that the fluid which circulates the inside of the quick connector of this example begins to leak outside. So, connection of the quick connector of this example is further stable, and the quick connector of this example of airtightness and fluid-tight nature is fully high.

[0051] If it explains in more detail, the front face of the periphery section of the major diameter 23 of the female member 2 will consist of an axis, two peripheral face 23a which is the arc cylinder side of this alignment, and two lateral-surface 23b which faces in opposite directions mutually. The window part 24 is formed in peripheral face 23a, and lateral-surface 23b is a flat surface which has a right-angled normal in the opposite direction of a window part 24. Although it is meant and lateral-surface 23b is prepared so that a worker may avoid a window part 24 automatically and the major diameter 23 of the female member 2 can be grasped, it also has the operation it is made not to roll when the female member 2 is put on base superiors.

[0052] As for a medium diameter portion 25, it has the peripheral face of the shape of a cylinder with a diameter smaller than a major diameter 23, and the bore is small formed also for the inner skin of a medium diameter portion 25 from the inner skin of a major diameter 23. As similarly shown in drawing 1 , on both sides of the ring member 41 made of resin, two O rings 42 are held in the hold space 220 of a medium diameter portion 25. So, if the first portion of the insertion edge 11 of the male part material 1 is inserted in a medium diameter portion 25, watertightness and airtightness will be secured between the inner skin of a medium diameter portion 25, and the peripheral face of the shape of a cylinder of the insertion edge 11.

[0053] Moreover, the bush 43 is being inserted and fixed to the hold space 220 between a major diameter 23 and a medium diameter portion 25. There are a part with a large bore and a small part in the inner skin between a major diameter 23 and a medium diameter portion 25, and if the peripheral face of a bush 43 engages with this inner skin and end insertion of the bush 43 is carried out, it will escape easily. That is, there is a flange in one edge of a bush 43, and it is prevented that a bush 43 is stuffed into the female member 2 by this flange beyond the need. Moreover, there is a comparatively small flange of an outer diameter also in the pars intermedia of a bush 43, and it is prevented that a bush 43 escapes from the female member 2 by this flange. Since the closure is carried out by the bush 43, it is prevented that the ring member 41 and O ring 42 escape from and come out from the medium diameter portion 25 of the female member 2. In addition, in the shape of a funnel, one inner skin of a bush 43 spreads, and is formed toward one side, and it is made easy to insert the tip 13 of the male part material 1 in an attachment component 3.

[0054] In addition, a narrow diameter portion 26 is a bell shape part smaller than a medium diameter portion 25, and the point of the insertion edge 11 of the male part material 1 including a tip 13 is inserted in the hold space 220 of a narrow diameter portion 26, and it fits into it. On the other hand, a hose connection 27 is the part of an abbreviation bell shape, and the passage hole 270 is formed in the core. A hose connection 27 has three steps 271 and one seal groove 272 in a peripheral face. Here, since a step 271 has the peripheral face of the shape of a partial conical surface which carried out the taper toward another side, when a hose etc. is connected, it prevents a hose falling out. Moreover, a seal groove is a slot for holding seal members, such as an O ring, among inner skin, such as a hose, holds a seal member and maintains watertightness and airtightness.

[0055] In addition, although the female member 2 is making the symmetry-of-revolution form the circumference of an axis mostly, only the major diameter 23 is carrying out the symmetry configuration about the plane of symmetry of two sheets which intersects perpendicularly mutually including an axis. Finally, an attachment component 3 is an one member made of polyamide resin by which most is inserted in the hold section 22 from the insertion open end 21 of the female member 2 and in which elastic deformation is possible, as again shown in drawing 1 . When an attachment component 3 is inserted in the hold section 22 of the female member 2 proper, it is a member which makes the hold section 22 of the female member 2 equip with the insertion edge 11 of the male part material 1 which intervened between the ring-like projected part 12 of the male part material 1, and stop side 24a of the female member 2, and was inserted from the insertion open end 21 of the female member 2.

[0056] That is, an attachment component 3 has the second stop section 35 which engages with the cross-section abbreviation C typeface-like body section 31 in which diameter expansion and diameter reduction are possible, and stop side 24a of the female member 2 by elastic deformation, and the actuation arm section 36 of the pair used in case a quick connector is removed. The body section 31 is a part with the taper wall 32 whose diameter inner skin 32a is reducing toward another side, and the attaching part 34 which it is prepared in the other-end section of the taper wall 32, and the ring-like projected part 12 of the insertion edge 11 of the male part material 1 fits in, and holds the insertion edge 11. The second stop section 35 is the heights which projected in the centrifugal direction from one edge of the body section 31, and were formed in one with the body section 31, and is a part which engages with the window part 24 as the first stop section of the female member 2. The actuation arm section 36 is the part of the pair which has the actuation edge 37 which projects from the insertion open end 21 also at the time of **** to the hold section 22 of a projection and the female member 2 in one side from one edge of the body section 31, and is energized by the elastic force of the body section 31 in the centrifugal direction and which faced in opposite directions mutually.

[0057] Here, the attaching part 34 of an attachment component 3 has the opening aperture 340 into which a part of ring-like projected part 12 of the male part material 1 fits. Moreover, the hold section 22 of the female member 2 has the window part 24 which carried out opening of the opening aperture 340 of an attachment component 3 to the location which it can keep seeing from an outside in a peripheral wall. So, if the ring-like projected part 12 of the male part material 1 fits into the opening aperture 340 of an attachment component 3, a part of ring-like projected part 12 can be exposed from the opening aperture 340, and it can inspect the situation visually from an outside through the window part 24 of the female member 2.

[0058] On the other hand, the lateral surface of the body section 31 of an attachment component 3 has inclined plane 32c approaching an axis as it goes to another side from the second stop section 35. So, in case an attachment component 3 is inserted in the female member 2, stop side 24a of an attachment component 3 is inscribed in the insertion open end 21 of the female member 2, and the diameter is automatically reduced as an attachment component 3 is stuffed into the female member 2. Consequently, an attachment component 3 can be easily inserted into the female member 2.

[0059] Moreover, the body section 31 of an attachment component 3 has the deficit section 330 (refer to drawing 4) formed from another side between the attaching parts 34 which adjoin a hoop direction mutually. So, in case an attachment component 3 is detached and attached to the male part material 1 or the female member 2, diameter expansion and diameter reduction of an attachment component 3 not only become easy, but the elastic deformation which is not axial symmetry becomes easy. Consequently, attachment and detachment of an attachment component 3 become easier.

[0060] The configuration of an attachment component 3 is explained in detail by the following, referring to drawing 3 - drawing 8 . Drawing 3 is the perspective view which looked at the attachment component 3 from one slant here, and drawing 4 is the side elevation which looked at the attachment component 3 from the same direction as drawing 1 . Drawing 5 is the bottom sectional view showing the V-V cross section of drawing 4 , and the bottom view of the attachment component 3 according [drawing 6] to VI view of drawing 4 , the front view of the attachment component 3 according [drawing 7] to the VII view of drawing 4 , and drawing 8 are the rear view of the attachment component 3 by the VIII view of drawing 4 .

[0061] The body section 31 of an attachment component 3 is the part of the shape of a cross-section abbreviation C typeface in which diameter expansion and diameter reduction are possible by elastic deformation, as shown in drawing 3 . Spacing of opening formed with the edge face-to-face which countered mutually [cross-section abbreviation C typeface-like both ends] is set up somewhat more narrowly than the outer diameter of the male part material 1. the funnel which counters mutually as the body section 31 is shown in drawing 4 -- it has the taper wall 32 of a pair with inner skin 32a of a **, and the connection section 33 which connects both the tapers wall 32. Inner skin 32a which both the tapers wall 32 countered mutually forms the taper side of the shape of a funnel which narrows as are shown in drawing 3 , drawing 5 , and drawing 8 and it goes to another side from one side continuously with medial-surface 36a of the actuation arm section 36.

[0062] On the other hand, the peripheral face of the body section 31 of an attachment component 3 has inclined plane 32c which leans so that it may approach in the direction of centripetalism as are shown in drawing 1 , drawing 4 , drawing 6 , and drawing 7 and it goes to another side from the second stop section 35. Width of face is thin also in the hoop direction as it goes to another side from the second stop section 35, and inclined plane 32c has the configuration which carried out the taper toward another side from the second stop section 35.

[0063] The body section 31 of an attachment component 3 has the attaching part 34 of the pair which has the opening aperture 340 of the pair which counters the other-end section of each taper wall 32 again. As shown in drawing 4 , both the attaching parts 34 are mutually separated by opening of the C typeface-like section, and the deficit section 330 of the connection section 33. Each attaching part 34 has the supporter 342 which supports the projection window frame section 341 at both ends in another side from the window frame section 341 which separates the taper wall 32 and predetermined distance and extends in a hoop direction, and the taper wall 32, as shown in drawing 6 .

[0064] The opening aperture 340 formed in each attaching part 34 is surrounded by the taper wall 32, the window frame section 341 which separates the taper wall 32 and predetermined distance and extends in a hoop direction, and the supporter 342 which supports the both ends of the projection window frame section 341 on another side from the taper wall 32. So, one side and another side are inserted into the opening aperture 340 by other end side 32b which is the other-end side of the taper wall 32, and inner end-face 341a which is one end face of the window frame section 341.

[0065] Moreover, the window frame section 341 has apical surface 341b which is an other-end side, and apical surface 341b is formed flat-tapped with the apical surface of another side of an attachment component 3. Furthermore, the inner skin of a supporter 342 forms inscribed side 342a which peripheral face 12c (refer to drawing 9) of the ring-like projected part 12 of the male part material 1 contacts, as shown in drawing 5 . In addition, as for the dimension of an attaching part 34, inscribed side 342a is set as light extent which becomes being closed and inserting in to the ring-like projected part 12 of the male part material 1.

[0066] As shown in drawing 4 and drawing 6 , the second stop section 35 of an attachment component 3 is the heights projected outside from the body section 31, and has end side 35a suitable for one side. End side 35a prevents an attachment component 3 falling out from the female member 2 in contact with stop side 24a of the window part 24 of the female member 2, as again shown in drawing 1 . So, the body section 31 of an attachment component 3 is formed only in the magnitude to which the second stop section 35 engages with stop side 24a of the female member 2 in the depth radial [predetermined] by unloaded condition.

[0067] The actuation arm section 36 is projected from one edge of the body section 31 to one side, as shown in drawing 3 - drawing 6 . The actuation arm section 36 has the actuation edge 37 which projects from the insertion open end 21 also at the time of **** to the hold section 22 of the female member 2, as again shown in drawing 1 . The actuation edge 37 is formed in the magnitude which an outside field does not protrude into radial from the major diameter 23 of the female member 2, and it is prevented that other surrounding members etc. contact the actuation edge 37 carelessly after the quick connector has joined. In addition, the actuation arm section 36 is energized by the elastic force of the body section 31 in the centrifugal direction also at the time of the hold to the hold section 22 of the female member 2, and medial-surface 36a of the actuation arm section 36 has separated distance from the peripheral face of the male part material 1.

[0068] In addition, the configuration of an attachment component 3 is symmetrical with a field about a V-V side, as again shown in drawing 4 .

(The operation effectiveness of an example 1) This example of a quick connector has two kinds of operations with connection and removal. First, connection of the quick connector of this example can be made by all among two kinds of procedures as follows.

[0069] As shown in drawing 9 , the insertion edge 11 of the male part material 1 is held by the attaching part 34 of an attachment component 3, and the first handshaking is performed where the male part material 1 and an attachment component 3 are assembled. That is, this procedure is performed after the ring-like projected part 12 of the male part material 1 has fitted into the opening aperture 340 of an attachment component 3. The insertion edge 11 of the male part material 1 is inserted in the hold section 22 of the female member 2 the whole attachment component 3, and the second stop section 35 of an attachment component 3 is made to engage with stop side 24a of the window part 24 of the female member 2 at it in this condition.

[0070] In this procedure, first, in case the insertion edge 11 of the male part material 1 is made to hold to an attachment component 3, an axis is about doubled from one edge of an attachment component 3, and the male part material 1 is inserted from a tip. If the axis of the male part material 1 and the axis of an attachment component 3 tend to insert the male part material 1 in an attachment component 3 in the condition of having shifted a little, medial-surface 36a of the actuation arm section 36 will contact the insertion edge 11 of the male part material 1, and a gap of an axis will be corrected automatically.

[0071] Then, the ring-like projected part 12 prepared in the insertion edge 11 of the male part material 1 contacts inner skin 32a (refer to drawing 3) of the taper wall 32 of an attachment component 3 by peripheral face 12c. And the insertion edge 11 of the male part material 1 is inserted in another side of the body section 31, extending the body section 31 of the shape of a cross-section abbreviation C typeface of an attachment component 3. If the male part material 1 is furthermore deeply inserted in an attachment component 3 and the ring-like projected part 12 of the male part material 1 reaches the attaching part 34 of an attachment component 3, the ring-like projected part 12 will fit into the opening aperture 340 of an attaching part 34 automatically. Consequently, as similarly shown in drawing 9 , the insertion edge 11 of the male part material 1 is held at the attaching part 34 of an attachment component 3, and the male part material 1 and an attachment component 3 are assembled.

[0072] After an appropriate time, the location of the hoop direction of stop side 24a of the window part 24 of the female member 2 and the second stop section 35 of an attachment component 3 doubles, and the insertion edge 11 of the male part material 1 is inserted in the hold section 22 from the insertion open end 21 of the female member 2 together with an attachment component 3. Consequently, if the predetermined immersion depth is reached, as again shown in drawing 1 , according to the elastic force of the body section 31 of the shape of a cross-section abbreviation C typeface of an attachment component 3, the second stop section 35 of an attachment component 3 will spread outside, and will engage with the window part 24 of a window part 24.

[0073] End side 35a (refer to drawing 4) of the second stop section 35 of an attachment component 3 counters stop side 24a of the window part 24 of the female member 2, and an attachment component 3 stops namely, end side 35a escaping from the female member 2 in contact with stop side 24a. Consequently, the body section 31 and the second stop section 35 of an attachment component 3 come to intervene between end side 12a of the ring-like projected part 12 of the male part material 1, and stop side 24a of the window part 24 of the female member 2. Then, even if it is going to draw out the male part material 1 from the female member 2, the male part material 1 stops escaping from the female member 2, and connection between the male part material 1 and the female member 2 completes it.

[0074] In the second handshaking, an attachment component 3 is inserted in the hold section 22 of the female member 2, the second stop section 35 of an attachment component 3 is made to engage with the window part 24 of the female member 2 first, and an attachment component 3 is held at the hold section 22 of the female member 2. Next, the insertion edge 11 of the male part material 1 is inserted in the hold section 22 and the attachment component 3 of the female member 2. That is, in this procedure, first, the location of the hoop direction of the second stop section 35 of an attachment component 3 doubles, is made the window part 24 as the first stop section of the female member 2, and an attachment component 3 is inserted in the hold section 22 of the female member 2 from the insertion open end 21. Under the present circumstances, an attachment component 3 is made to reduce the diameter automatically, and is inserted in the

hold section 22 of the female member 2 as the edge of the second stop section 35 of an attachment component 3 ****s to guidance taper side 21b of the insertion open end 21 of the female member 2 and an attachment component 3 is inserted in the female member 2.
[0075] And if an attachment component 3 reaches the predetermined immersion depth, the second stop section 35 of an attachment component 3 will be energized in the diameter expansion direction according to the elastic force of the body section 31, will displace toward an outside, and will engage with the window part 24 of the female member 2. Consequently, as again shown in drawing 1 , an attachment component 3 is held, without falling out from the hold section 22 of the female member 2. Here, the actuation edge 37 of the actuation arm section 36 of an attachment component 3 is maintained at the condition of having projected from the insertion open end 21 of the female member 2 to one side.
[0076] After an appropriate time, an axis is doubled about and the male part material 3 is inserted from a tip 13 from one edge of the female member 2 and an attachment component 3. Under the present circumstances, the insertion edge 11 of the male part material 1 is inserted in an attachment component 3, medial-surface 36a of the actuation arm section 36 of an attachment component 3 showing around in slide contact with the ring-like projected part 12 of the male part material 1. Since medial-surface 36a of the actuation arm section 36 of an attachment component 3 is following inner skin 32a of the taper wall 32, the ring-like projected part 12 of the male part material 1 is smoothly inserted further in the interior of the body section 31.
[0077] Consequently, it is inserted in another side of the body section 31, the ring-like projected part 12 prepared in the insertion edge 11 of the male part material 3 contacting inner skin 32a of the taper wall 32 of an attachment component 3 by peripheral face 12c, and extending the body section 31 of the shape of a cross-section abbreviation C typeface of an attachment component 3. Under the present circumstances, since the diameter of the body section 31 of an attachment component 3 is expanded by the ring-like projected part 12 of the male part material 1, the elastic force of an attachment component 3 acts in the direction whose diameter is reduced.
[0078] If the male part material 1 is furthermore deeply inserted in an attachment component 3 and the ring-like projected part 12 of the male part material 1 reaches the attaching part 34 of an attachment component 3, the ring-like projected part 12 will fit into the opening aperture 340 of an attaching part 34 automatically. Namely, spacing of the attaching part 34 of the pair which countered mutually according to the elastic force of the body section 31 of an attachment component 3 is narrowed, and, as for a ball lump and the insertion edge 11 of the male part material 1, the ring-like projected part 12 is pinched by the opening aperture 340 at the attaching part 34 of an attachment component 3.
[0079] Then, as similarly shown in drawing 1 , the body section 31 and the second stop section 35 of an attachment component 3 come to intervene between stop side 24a of the ring-like projected part 12 of the male part material 1, and the window part 24 of the female member 2. Consequently, without actuation of the actuation arm section 36, the male part material 1 stops escaping from the female member 2, and connection between the male part material 1 and the female member 2 completes it. That is, if the external force which is going to draw out the male part material 1 from the female member 2 acts, end side 35a of the second stop section 35 of an attachment component 3 will contact stop side 24a of the window part 24 of the female member 2. Then, the body section 31 and the second stop section 35 of an attachment component 3 intervene between end side 12a of the ring-like projected part 12 of the male part material 1, and stop side 24a of the window part 24 of the female member 2, and compressive stress is borne. Here, compressive stress can be borne, without being divided or carrying out buckling, since the body section 31 and the second stop section 35 of an attachment component 3 are formed firmly enough. Even if it is going to draw out the male part material 1 from the female member 2, unless the actuation arm section 36 is operated, the male part material 1 stops escaping from the female member 2, and the male part material 1 and the female member 2 come [consequently,] to be connected firmly.
[0080] On the contrary, an operation of the external force which is going to stuff the male part material 1 into the female member 2 further pinches the window frame section 341 of an

attaching part 34 between the bushes 43 and the ring-like projected parts 12 of the male part material 1 which were fixed to the female member 2 by fitting in, as similarly shown in drawing 1 . So, the thrust which acted on the male part material 1 is transmitted to the bush 43 held through the window frame section 341 of an attaching part 34 at the female member 2. Since as for a bush 43 it is firmly fixed to the female member 2 and the window frame section 341 of an attaching part 34 can bear sufficient thrust, the quick connector of this example can also bear the external force which is going to stuff the male part material 1 into the female member 2.

[0081] Under the present circumstances, the actuation edge 37 of an attachment component 3 is arranged so that it may have thrust in the insertion open end 21 of the female member 2 and may not contact. So, since external force is not transmitted to other parts of an attachment component 3 and stress does not occur, an attachment component 3 pushing in and damaging according to external force is prevented. Consequently, firm connection is obtained though connection of the quick connector of this example is very easy. Moreover, since the attachment component is held before connection at a female member or male part material, dropping an attachment component in a work site is prevented. It is possible not only it but to manage handshaking of a quick connector single hand, even if it is said which procedure if one side is being fixed among male part material and a female member.

[0082] Furthermore, in case the ring-like projected part 12 of the male part material 1 fits into the opening aperture 340 of an attachment component 3, an attachment component 3 reduces the diameter rapidly with elastic force, and there is a response in which there was a sound called PACHITSU and which fitted in. Also in case similarly the second stop section 35 of an attachment component 3 fits into the window part 24 which is the first stop section of the female member 2, an attachment component 3 has elastic force, the diameter is expanded rapidly, and there is a response in which there was a sound called PACHITSU and which fitted in. It can also be clearly inspected visually through the window part 24 of the female member 2 not only it but that the second stop section 35 of an attachment component 3 has fitted into a window part 24 and that the ring-like projected part 12 of the male part material 1 has fitted into the opening aperture 340 of an attachment component 3. Here, since a worker has flat lateral-surface 23b of the major diameter 23 of the female member 2 with a finger automatically in case the quick connector of this example is connected, the check by looking from a window part 24 becomes easy. So, in the quick connector of this example, connection between the male part material 1 and the female member 2 is ensured.

[0083] In addition, as similarly shown in drawing 1 , the inner skin of the medium diameter portion 25 of the hold section 22 of the female member 2 is contacted, and two O rings 42 are arranged on both sides of the ring member 41. Two O rings 42 intervened between the peripheral face of the shape of a cylinder of the insertion edge 11 of the male part material 1, and the inner skin of the female member 2, and have achieved the operation which maintains airtightness and fluid-tight nature between the male part material 1 and the female member 2.

[0084] On the other hand, removal and decomposition of this example of a quick connector are performed as follows. An attachment component 3 has the second stop section 35 which engages with the cross-section abbreviation C typeface-like body section 31 in which elastic deformation is possible, and the window part 24 of the female member 2 with the taper wall 32 and an attaching part 34, and the actuation arm section 36 which the actuation edge 37 has projected from the female member 2, as similarly shown in drawing 1 . It is separated from the peripheral face of the male part material 1 here also in the condition of having been inserted in the hold section 22 of the female member 2 since the actuation arm section 36 was energized outside by the elastic force of the body section 31, and the taper wall 32 of the body section 31 is separated from the peripheral face of the male part material 1 similarly. So, if the actuation edge 37 of the actuation arm section 36 is pushed in the direction of centripetalism and contracted by a fingertip etc., the diameter of the taper wall 32 of the body section 31 will also be reduced in the direction of centripetalism. Then, since the second stop section 35 separates in the direction of centripetalism from stop side 24a of the female member 2 with diameter reduction of the taper wall 32, if the male part material 1 is drawn out, the male part material 1 and an attachment component 3 can be removed from the female member 2.

[0085] Since the ring-like projected part 12 of the male part material 1 has fitted into the attaching part 34 of an attachment component 3 in that case, as again shown in drawing 9 , the attachment component 3 is maintaining the condition of having engaged with the insertion edge 11 of the male part material 1, and having been assembled by the male part material 1 and one. So, even if it draws out the male part material 1 and an attachment component 3 from the female member 2, an attachment component 3 does not drop out of the male part material 1 carelessly.

[0086] What is necessary is just to pull an attachment component 3 to the method of the outside of the direction of an axial right angle so that the insertion edge 11 of the male part material 1 may come out from opening of the body section 31 of the shape of a cross-section abbreviation C typeface of an attachment component 3 in order to decompose the male part material 1 and an attachment component 3 and to remove an attachment component 3 from the male part material 1. In that case, only in the part which can pass the ring-like projected part 12 of the male part material 1, the body section 31 of an attachment component 3 expands the diameter of opening of the cross-section abbreviation C typeface-like body section 31, a C typeface-like cross section just needs to spread, and the serious form of an attachment component 3 is avoided. So, also in case an attachment component 3 is removed from the male part material 1, un-arranging [which an attachment component 3 damages according to a form very much] is prevented. Moreover, a worker can also remove an attachment component 3 from the male part material 1 single hand, and removal from the male part material 1 of an attachment component 3 is very easy. Consequently, without being damaged, also from the female member 2, since it is separable also from the male part material 1, an attachment component 3 can use an attachment component 3 any number of times. Of course, not only the attachment component 3 but the male part material 1 and the female member 2 are reusable.

[0087] Therefore, reuse of an attachment component 3 is not only easy, but according to the quick connector of this example, without using instruments, such as a release implement, it is effective in removal and decomposition of a quick connector being easy. Moreover, it is effective in that connection of a quick connector may be made certainly and easily as mentioned above.

[Example 2]

(Configuration of an example 2) The example 2 of a quick connector is the same configuration as an example 1 except for the point that the check member 5 is added in the condition that the male part material 1 is not inserted, as shown in drawing 10 , drawing 11 , and drawing 12 . So, this example explains preponderantly the configuration and the operation effectiveness of the check member 5.

[0088] That is, the check member 5 is an one member made of resin which consisted of the C typeface-like section 51, a stop height 52 of a pair, and the Toride section 53 in the female member 2 and the check member 5 as shown in drawing 13 . The hold section 22 is equipped with the C typeface-like section 51 from the periphery side of the hold section 22 of the female member 2, and it is the part of the shape of a C typeface whose diameter can be expanded by elastic deformation. The stop height 52 of a pair is the projection part of the pair inserted in the method of the inside of radial from the both ends of the C typeface-like section 51 at a projection and each opening aperture 340 (refer to drawing 4) of the attaching part 34 of an attachment component 3, respectively from each window part 24 of the hold section 22 of the female member 2. The Toride section 53 is the handle part of the shape of a ring connected with the center section of the C typeface-like section 51.

[0089] Here, the check member 5 is a member by which each stop height 52 is extruded in the centrifugal direction, and the diameter of the C typeface-like section 51 is expanded by peripheral face 12c of the ring-like projected part 12 of the male part material 1 through the opening aperture 340 of an attachment component 3, when association with the male part material 1 and the female member 2 is completed. In addition, the check member 5 is carrying out the symmetry configuration about the second plane of symmetry Q, is related with the first plane of symmetry P, and can engage with the female member 2 and an attachment component 3 also from the direction of a gap.

[0090] It explains in more detail, referring to drawing 13 similarly about the configuration of the check member 5. The C typeface-like section 51 engages with peripheral face 23a and lateral-surface 23b of a major diameter 23 of the female member 2 exactly, and is inserting the stop height 52 of a pair in the interior from the window part 24 of the female member 2 with the elastic force which resin has. The stop height 52 of a pair has engagement side 52a, apical surface 52b, and slide contact side 52c, respectively. Stop side 24a is a field which forms notching between the C typeface-like section 51 and the stop height 52 of a pair, and is engaging with opening side-face 24b of the window part 24 of the female member 2 in the condition that the male part material 1 is not inserted. So, even if a worker pulls the check member 5, applying a finger to the Toride section 53, since stop side 24a is engaging with opening side-face 24b of a window part 24 and the C typeface-like section 51 does not expand the diameter, the check member 5 does not fall out from the female member 2.

[0091] If the ring-like projected part 12 of the male part material 1 is inserted proper as shown in drawing 14 , apical surface 52b will contact the ring-like projected part 12 at least by the part, and will become the point of application of force which spacing of the stop height 52 of a pair can extend. Thus, if spacing of the stop height 52 of a pair can extend and the diameter of the C typeface-like section 51 is expanded, engagement side 52a will separate from the window part 24 of the female member 2. In this condition, the edge of a window part 24 is in contact with slide contact side 52c. Slide contact side 52c ****ing on the edge of the window part 24 of the female member 2, if a worker pulls the check member 5, applying a finger to the Toride section 53, the diameter of the C typeface-like section 51 is expanded still more, and the ****** member 5 comes [so,] to separate from the female member 2 at last.

[0092] (The operation effectiveness of an example 2) As again shown in drawing 10 , in the condition that an attachment component 3 is inserted in the female member 2, and a window part 24 and the second stop section 35 are being engaged mutually, the stop height 52 of the pair of the check member 5 is inserted in the opening aperture 340 of an attachment component 3 through the window part 24 of the female member 2. In this condition, as again shown in drawing 13 , the check member 5 is engaging with the window part 24 of the female member 2 by engagement side 52a, and even if the check member 5 is pulled by radial, it does not separate from it from the female member 2.

[0093] However, if the insertion edge 11 of the male part material 1 is inserted proper into the female member 2 and an attachment component 3 and the ring-like projected part 12 of the male part material 1 fits into the opening aperture 340 of an attachment component 3, situations differ. That is, as again shown in drawing 14 , peripheral face 12c of the ring-like projected part 12 extrudes outside the stop height 52 which countered mutually in contact with apical surface 52b of the stop height 52 of the check member 5. Consequently, the diameter of the C typeface-like section 51 of the check member 5 is expanded, engagement side 52a of the check member 5 separates from it from the window part 24 of the female member 2, and slide contact side 52c of the check member 5 comes to **** on the edge of a window part 24. Then, engagement to the C typeface-like section 51 of the check member 5 and the window part 24 of the female member 2 will solve. Consequently, if the check member 5 is pulled by radial, ****ing to the window part 24 of the female member 2, the C typeface-like section 51 will expand the diameter further, and slide contact side 52c will come to separate from the check member 5 from the female member 2.

[0094] Namely, after a worker inserts the male part material 1 in the female member 2 and an attachment component 3 and connects a quick connector, he should just pull the check member 5, applying a finger to the Toride section 53. As a result of pulling the check member 5, it has that the check member 5 separates from the female member 2, and a worker cannot inspect visually but ** can also check that the quick connector is connected proper. So, also when it must work by groping in the part into which various facilities extended far back, it can be checked that the quick connector has been connected without visual inspection proper.

[0095] Consequently, according to this example, it is effective in the dependability of connection of the quick connector by groping improving. Moreover, since it seems that the check member 5 does not separate from the female member 2, and the check member 5 does not separate automatically unless a worker pulls in the Toride section 53, applying a finger, the check member

5 is dropped and it does not lose.
(Deformation mode 1 of an example 2) The operation of a quick connector which has the check member 5 which has the pars intermedia which engages with the major diameter 23 of the female member 2 between the C typeface-like section 51 and the Toride section 53 as a deformation mode 1 of this example is possible. In this deformation mode, since pars intermedia engages with the female member 2 and it is equal to torsion also when a worker twists the Toride section 53, the C typeface-like section 51 is twisted and the diameter is not expanded. So, since the check member 5 does not separate by actuation that a worker is un-proper, either, unless a quick connector is joined proper, it is effective in the dependability of connection of a quick connector improving more.

[0096] (Deformation mode 2 of an example 2) The operation of a quick connector which has the check member 5 which has the Toride section 53 of the shape of a ring which has notching in a part as a deformation mode 2 of this example is possible. In this deformation mode, if a worker is going to draw out the check member 5 forcibly in the condition that an attachment component 3 and the male part material 1 have not fitted into the female member 2 proper, a part of Toride section 53 will fracture from notching. So, since the check member 5 does not separate by actuation that a worker is un-proper, either, unless a quick connector is joined proper, it is effective in the dependability of connection of a quick connector improving more.

[0097] [Example 3]
(Configuration of an example 3) As the example 3 of a quick connector is shown in drawing 15 , the male part material 1 and the female member 2 are the same as that of them of an example 1, and the configuration of attaching part 34' of an attachment component 3 differs from it of an example 1.

[0098] namely, -- drawing 16 -- being shown -- as -- an attachment component -- three -- an attaching part -- 34 -- mutual -- countering -- a pair -- an attaching part -- 34 -- ' -- **** -- an example -- one -- **** -- opening -- an aperture -- 340 -- forming -- having -- **** -- a thing -- receiving -- respectively -- a core -- a direction -- opening -- having carried out -- a slot -- 340 -- ' -- forming -- having -- **** . As again shown in drawing 15 , the ring-like projected part 12 of the male part material 1 fits into slot 340of attaching part 34", and the male part material 1 is fixed to the female member 2 through an attachment component 3.

[0099] (The operation effectiveness of an example 3) The operation effectiveness of the quick connector of this example is the same as the operation effectiveness of an example 1 in general. If a fine difference is described, the reinforcement of direction of the attachment component 3 of this example of attaching part 34' improves, and it is stronger.

[0100] Conversely, there are many points that the direction of the attachment component 3 of an example 1 won. That is, in the example 1, the direct visual inspection of the ring-like projected part 12 of the male part material 1 having fitted into the opening aperture 340 of an attachment component 3 can be carried out through the window part 24 of the hold section 22 of the female member 2 also in the condition of having been inserted in the female member 2. Moreover, in the attachment component 3 of an example 1, it is possible like an example 2 to adopt the check member 5. Furthermore, the attachment component 3 of an example 1 is easier for manufacture on account of the mold rate of injection molding of resin.

[0101] [Example 4]
(Configuration of an example 4) The example 4 of the configuration of others in which the configuration of the major diameter 23 of the female member 2 and a part of configuration of an attachment component 3 contain the male part material 1 unlike an example 1 of a quick connector is the same as an example 1. So, this example explains a different part from an example 1 among the configuration of the female member 2, and the configuration of an attachment component 3.

[0102] As for the female member 2, it of an example 1 differs from the configuration in respect of the following. As the female member 2 is shown in drawing 17 - drawing 19 , in case only predetermined thickness is projected in the direction of centripetalism from the inner circle wall of the hold section 22 and an attachment component 3 is inserted in the first place at the hold section 22, it has the fitting heights 231 of the pair which can fit into the deficit section 330 of an attachment component 3. That is, the fitting heights 231 of a pair are the heights which projected in the direction of centripetalism by predetermined thickness, and countered it mutually from the inner skin of the major diameter 23 of the female member 2. Each fitting heights 231 are formed in a configuration which projects from the other-end section of the inner skin of a major diameter 23 to one side, and the tip is formed in the shape of a taper so that an attachment component 3 may tend to be engaged.

[0103] A window part 24 is adjoined at the inner skin of the major diameter 23 of the female member 2, and the guidance crevice 232 is formed in the second at the both sides of a hoop direction. The guidance crevice 232 is a crevice in which Mikata was formed of the slant face except for the direction which touches a window part 24. If the second stop section 35 of an attachment component 3 gets into the guidance crevice 232, an attachment component 3 will rotate to a hoop direction automatically by the elastic force, and the second stop section 35 will fit into the window part 24 of the female member 2.

[0104] The female member 2 has the regulation projected part 211 of the pair which extends by predetermined width of face in predetermined thickness in the direction of centripetalism in a projection hoop direction the third in a location which is different among the insertion open ends 21 in the window part 24 and hoop direction of a pair as the first stop section, as shown at drawing 20 . The regulation projected part 211 of three (refer to drawing 24) attachment component attached in the male part material 1 (refer to drawing 9) is a projected part which prevents that an attachment component 3 is inserted in the interior of the hold section 22 of the female member 2 in contact with the second stop section 35 of an attachment component 3, when there is nothing in a proper angle-of-rotation location. That is, as shown in drawing 21 , the regulation projected part 211 is projected to the inner direction rather than the inner skin of the radius R of the insertion open end 21, and prevents penetration of the second stop section 35 of the pair projected in the centrifugal direction from an attachment component 3. As shown not only in it but in drawing 22 , a part of regulation projected part 211 is projected from opening end-face 21a of the insertion open end 21 to trapezoidal shape to one side, and it forms regulation end-face 211a. As shown in drawing 23 , medial-surface 211b of the regulation projected part 211 is the direction of axial length of the female member 2, and a primary curved surface currently formed in parallel.

[0105] In the fourth, the female member 2 has guidance taper side 21b of beveling which follows the part corresponding to the window part 24 as the first stop section from opening end-face 21a of the insertion open end 21 to the inner circle wall of the hold section 22 among the insertion open ends 21, as shown again at drawing 22 . That is, only the part which is equivalent to the window part 24 of a hoop direction among the insertion open ends 21 is countered, the pair is formed, and in the regulation projected part 211 of the above-mentioned pair, guidance taper side 21b vacates predetermined spacing for a hoop direction, and is formed in it.

[0106] As the female member 2 is again shown in the fifth at drawing 23 , it has guidance slant-face 21c of the pair which continues from opening end-face 21a of the insertion open end 21 to each guidance taper side 21b to the both ends of each guidance taper side 21b. That is, guidance slant-face 21c is formed in the both ends of each guidance taper side 21b, makes a hoop direction rotate the second stop section 35 (to refer to drawing 24) of the attachment component 3 which contacted guidance slant-face 21c with thrust, and is made to contact guidance taper side 21b.

[0107] It has guidance slant-face 211c which extends in a hoop direction from regulation end-face 211a of the regulation projected part 211, and arrives at the both ends of each regulation projected part 211 even at opening end-face 21a the sixth as the female member 2 is similarly shown in drawing 23 . The tip of guidance slant-face 211c of each regulation projected part 211 has touched at the tip of guidance slant-face 21c of the both ends of guidance taper side 21b. So, the second stop section 35 of the attachment component 3 which contacted guidance slant-face 211c of the regulation projected part 211 with thrust moves to a hoop direction, ****ing to guidance slant-face 211c and guidance slant-face 21c. So, if it separates from the second stop section 35 of an attachment component 3 from the regulation projected part 211, it will slide even into guidance taper side 21b through guidance slant-face 211c to guidance slant-face 21c.

[0108] On the other hand, as for the attachment component 3, it of an example 1 differs from the configuration in respect of the following. In the first place, an attachment component 3 has regulation flat-surface 35b of a predetermined area formed in another side of the second stop section 35 by intersecting perpendicularly with the direction of an axis, as shown at drawing 24 . Regulation flat-surface 35b of three attachment component attached in the male part material 1 is a flat surface which prevents that an attachment component 3 is inserted in the interior of the hold section 22 of the female member 2 in contact with regulation end-face 211a of the regulation projected part 211 of the female member 1, when there is nothing in a proper angle-of-rotation location. In addition, the angle of the other-end section of the second stop section 35 attaches a proper R, is formed, and when the second stop section 35 is in a proper angle-of-rotation location, it ****s to guidance taper side 21b of the female member 2.

[0109] Inclined plane 32c of an attachment component 3 is straightly formed [second] until it results [from regulation flat-surface 35b of each second stop section 35] in an attaching part 34. That is, inclined plane 32c is formed in respect of the taper of the shape of the approximate circle conical surface which has neither accordion-fold nor the vena contracta on the way until it results [from regulation flat-surface 35b] in other end side 32b of the taper wall 32. as [carry out / the taper wall 32 / even if it acts on the taper wall 32 in which excessive compressive stress forms inclined plane 32c / so, / the male part material 1 and the female member 2 are pulled after connection, and / local buckling] -- things -- it is prevented.

[0110] Since the R is formed in the corner of the deficit section 330 of the connection section 33 the third and stress concentration is mitigated, it is prevented that a crack enters from the corner of the deficit section 330. So, an attachment component 3 can be further reused now many times.

(The operation effectiveness of an example 4) Since the quick connector of this example is constituted as mentioned above, it has the following operation effectiveness.

[0111] First, the case where about 90 degrees of attachment components 3 (drawing 9 reference) which fitted into the male part material 1 shift, and they tend to be inserted in the circumference of a medial axis to the female member 2 from the angle-of-rotation location (condition which has a window part 24 and the second stop section 35 in the same angular position) of normal is assumed. Then, other end side 35b formed in the second stop section 35 of the pair of an attachment component 3 contacts regulation end-face 211a of the regulation projected part 211 of the female member 2, and the attachment component 3 holding the male part material 1 must have been inserted in more than it and the female member 2. That is, it is prevented even if it is going to insert in the female member 2 the attachment component 3 which held the male part material 1 with remarkable thrust. So, it is easily recognized by the worker that the attachment component 3 has separated from the angle-of-rotation location of normal greatly to the female member 2.

[0112] Next, the case where a worker rotates an attachment component 3 and the angle-of-rotation location of normal is explored is assumed. If other end side 35b of the second stop section 35 of an attachment component 3 shifts from regulation flat-surface 35b of the female member 2, the hoop direction edge of the second stop section 35 of an attachment component 3 will contact guidance slant-face 211c of the regulation projected part 211 of the female member 2. Then, since the attachment component 3 has received external force in the direction stuffed into the female member 2, the hoop direction edge of the second stop section 35 of an attachment component 3 slides on it in slide contact with guidance slant-face 211c of the female member 2. Then, the hoop direction edge of the second stop section 35 of an attachment component 3 continues ****ing to guidance slant-face 21c which adjoins guidance slant-face 211c. Consequently, the second stop section 35 of an attachment component 3 comes to contact guidance taper side 21b of the female member 2. In the meantime, as for the attachment component 3 holding the male part material 1, only a few is further inserted in the female member 2.

[0113] After the second stop section 35 of an attachment component 3 has contacted guidance taper side 21b of the female member 2, an attachment component 3 is in the angle-of-rotation location of normal in general, and what prevents insertion of an attachment component 3 of it is lost. So, it becomes possible to be further pushed in into the female member 2, the diameter of the attachment component 3 holding the male part material 1 being reduced, and the second stop section 35 of an attachment component 3 passes over the insertion open end 21 of the female member 2, and comes to be inserted even in the hold section 22. Then, the tip of the fitting heights 231 of the pair of the female member 2 begins to fit into the deficit section 330 of the connection section 33 of an attachment component 3, and opening of the shape of a C character of the body section 31. The attachment component 3 is inserted in the hold section 22 of the female member 2, an angle-of-rotation location being corrected even if the angle-of-rotation location of an attachment component 3 has shifted from the location of normal for a while, since the taper of the tip of each fitting heights 231 is carried out as mentioned above. Under the present circumstances, the guidance crevice 232 currently formed in the both sides of the window part 24 of the female member 2 leads the second stop section 35 energized outside by the elastic force of an attachment component 3 to a window part 24. If the attachment component 3 holding the male part material 1 is inserted in the hold section 22 of the female member 2 by regular Mr. Fukashi, the second stop section 35 energized outside by the elastic force of an attachment component 3 will come to fit into the window part 24 as the first stop section.

[0114] Once the second stop section 35 of an attachment component 3 fits into the window part 24 of the female member 2, unless a worker will operate the actuation arm section 36, even if it pushes and lengthens, association with the male part material 1 and the female member 2 cannot be solved. Such a stop operation that an attachment component 3 has is the same as that of it of an example 1. That is, according to this example, the male part material 1 and the female member 2 can be easily combined only by doubling the attachment component 3 holding the male part material 1 in the to some extent large range focusing on the angular position of normal, and stuffing it into the female member 2. Consequently, it is effective in working hours are not only shortening, but in addition to the effectiveness of the above-mentioned example 1, a worker's burden being mitigated and connection of a much more positive quick connector coming to be obtained.

[0115] Moreover, since the guidance crevice 232 is formed, when inserting the male part material 1 in the female member 2 which held the attachment component 3 to the major diameter 23 beforehand, it becomes easy to expand the diameter of the body section 31 of an attachment component 3, and the insertion force of the male part material 1 can be reduced.

[0116]

[Effect of the Invention] As explained in full detail above, reuse of an attachment component is not only easy, but according to the quick connector of this invention, without using instruments, such as a release implement, it is effective in removal and decomposition being easy.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The half section Fig. showing the whole quick connector configuration as an example 1
[Drawing 2] The half section Fig. showing the configuration of the female member of an example 1
[Drawing 3] The perspective view showing the configuration of the attachment component of an example 1
[Drawing 4] The side elevation showing the configuration of the attachment component of an example 1
[Drawing 5] The bottom sectional view showing the configuration of the attachment component of an example 1
[Drawing 6] The bottom view showing the configuration of the attachment component of an example 1
[Drawing 7] The front view showing the configuration of the attachment component of an example 1
[Drawing 8] Rear view showing the configuration of the attachment component of an example 1
[Drawing 9] The side elevation showing the engagement condition of the male part material of an example 1, and an attachment component
[Drawing 10] The half section Fig. showing a female member, an attachment component, a check member, etc. of an example 2
[Drawing 11] The side elevation showing the engagement condition of the check member of an example 2
[Drawing 12] Rear view showing the engagement condition of the check member of an example 2

[Drawing 13] The sectional view showing the engagement condition of the check member of an example 2
[Drawing 14] The sectional view showing the diameter expansion condition of the check member of an example 2
[Drawing 15] The half section Fig. showing the whole quick connector configuration as an example 3
[Drawing 16] The sectional view showing the configuration of the attachment component of an example 3
[Drawing 17] The half section Fig. showing the configuration of the female member of an example 4
[Drawing 18] The plane section Fig. showing the important section configuration of the female member of an example 4
[Drawing 19] The sectional side elevation showing the important section configuration of the female member of an example 4
[Drawing 20] Rear view showing the configuration of the insertion open end of the female member of an example 4
[Drawing 21] Partial rear view showing the important section configuration of the insertion open end of the female member of an example 4

[Drawing 22] The perspective view showing the whole female member configuration of an example 4
[Drawing 23] The perspective view expanding and showing the configuration of the insertion open end of the female member of an example 4
[Drawing 24] The side elevation showing the configuration of the attachment component of an example 4
[Drawing 25] The sectional view showing the whole quick connector configuration of the first conventional type
[Drawing 26] Rear view showing the configuration of the attachment component of the first conventional type
[Drawing 27] The sectional side elevation showing the configuration of the attachment component of the first conventional type
[Drawing 28] The half section Fig. showing the whole quick connector configuration of the second conventional type
[Drawing 29] The perspective view showing the configuration of the attachment component of the second conventional type
[Description of Notations]
1: Male part material
11: Insertion edge
12: Ring-like projected part
12a: End side 12b: Other end side 12c: Peripheral face
13: Tip
2: Female member
21: Insertion open end 210: Insertion hole
21a: Opening end face 21b: Guidance taper side 21c: Guidance slant face
211: Regulation projected part
211a: Regulation end face 211b: Medial surface 211c: Guidance slant face
22: Hold section 220: Hold space
23: Major diameter
23a: Peripheral face 23b: Lateral surface
23c: Inner skin 23d: Slideway
231: Fitting heights 232: Guidance crevice
24: Window part (as the first stop section)
24a: Stop side 24b: Opening side face 24c: Opposed face
25: Medium diameter portion
26: Narrow diameter portion
27: Hose connection 270: Passage hole
271: Step 272: Seal groove
3: Attachment component
31: Body section
32: Taper wall
32a: Inner skin 32b: Other end side 32c: Inclined plane
33: Connection section 330: Deficit section
34 34':attaching-part 340: Opening aperture 340':slot
341: Window frame section 341a: Inside end face 341b: Apical surface
342: Supporter 342a: Inscribed side
35: The second stop section 35a: End side 35b: Other end side
36: Actuation arm section 36a: Medial surface
37: Actuation edge
4: Seal members
41: Ring member 42: O ring 43: Bush
5: Check member
51: C typeface-like section
52: Stop height

52a: Engagement side 52b: Apical surface 52c: Slide contact side
53: Toride section
P: The first plane of symmetry Q: The second plane of symmetry

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[Translation done.]

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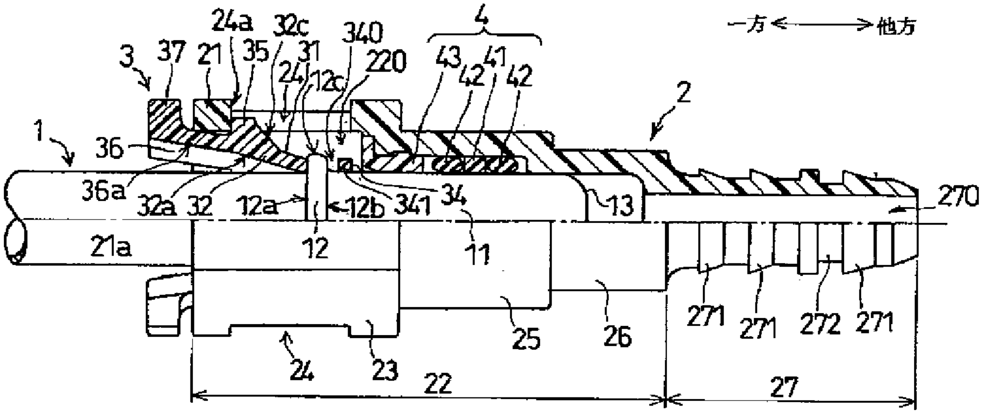
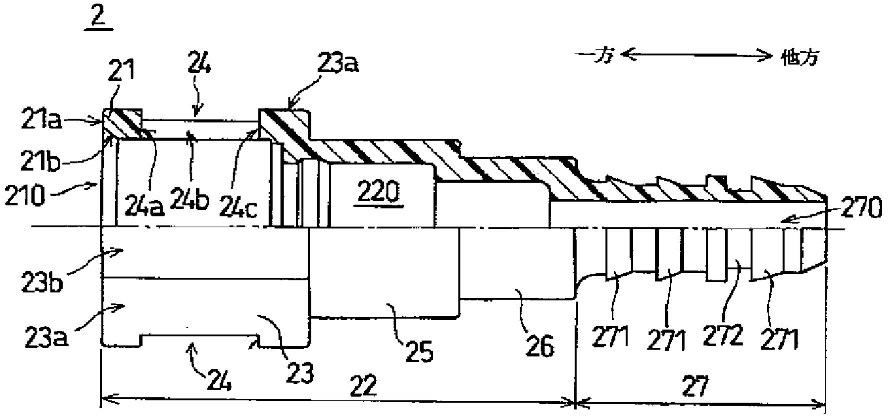
DRAWINGS

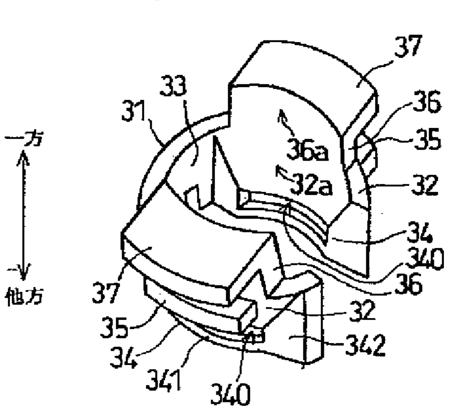
[Drawing 1]



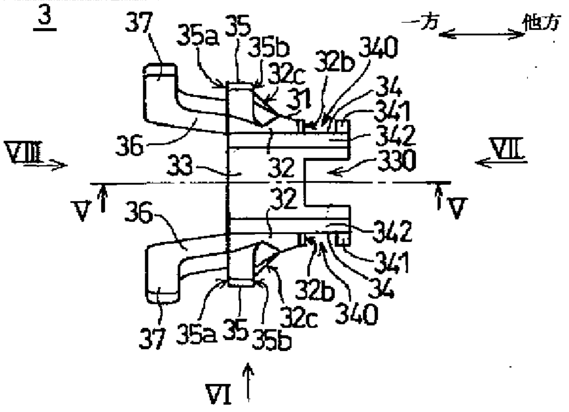
[Drawing 2]



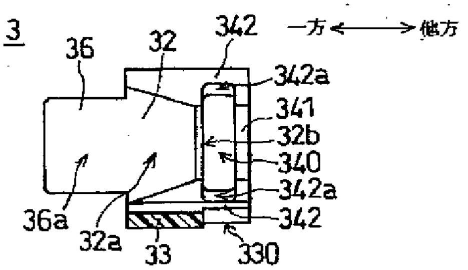
[Drawing 3]



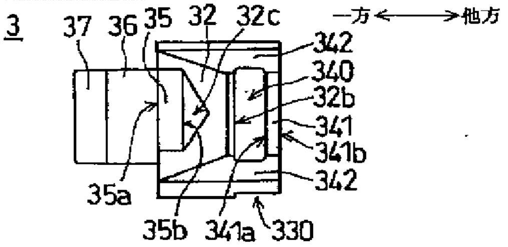
[Drawing 4]



[Drawing 5]



[Drawing 6]



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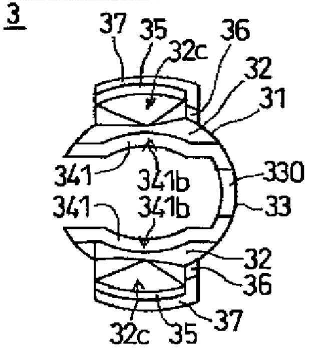
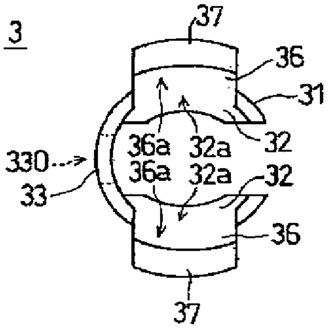
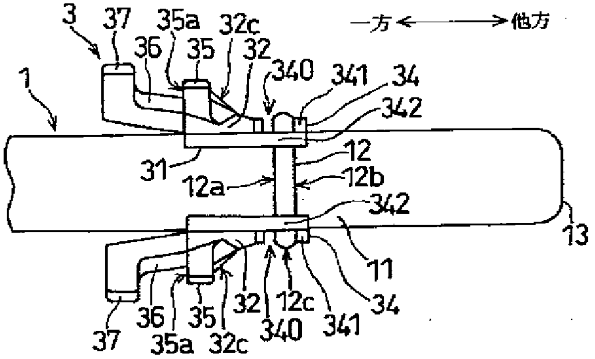


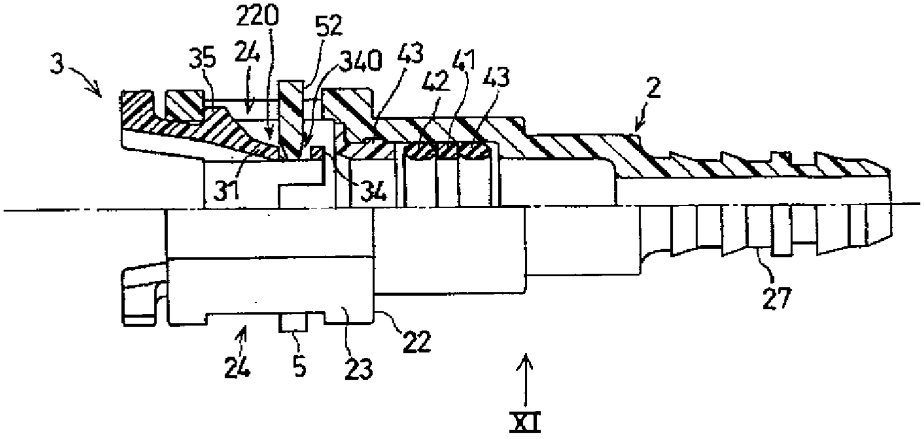
[Drawing 8]



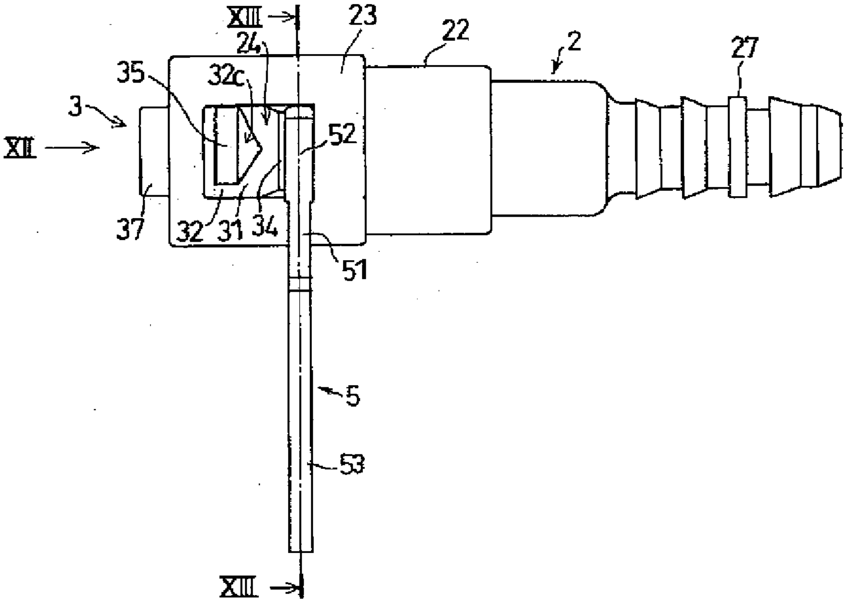
[Drawing 9]



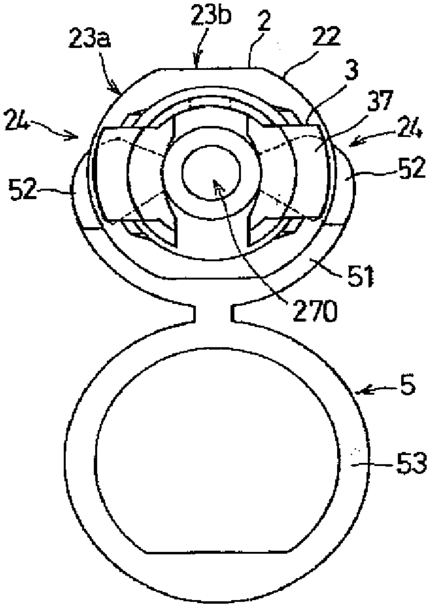
[Drawing 10]



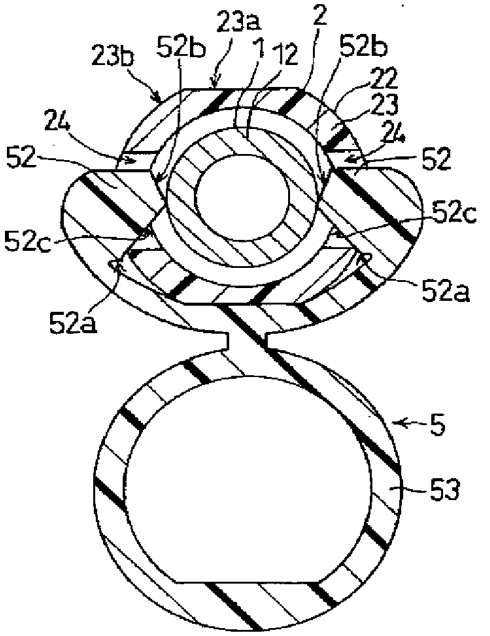
[Drawing 11]



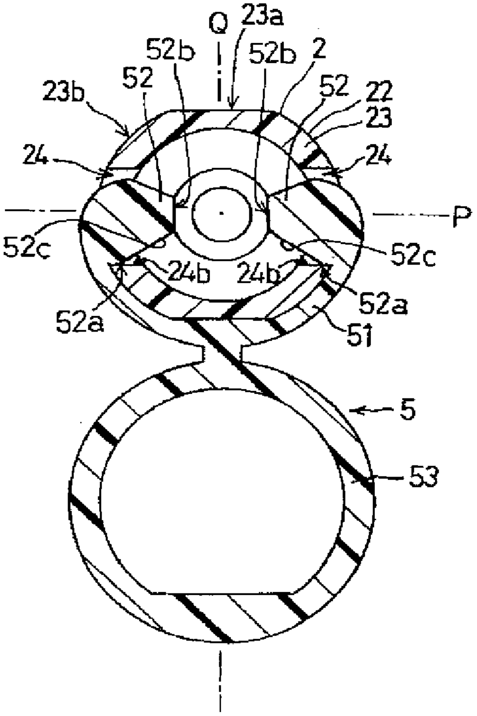
[Drawing 12]



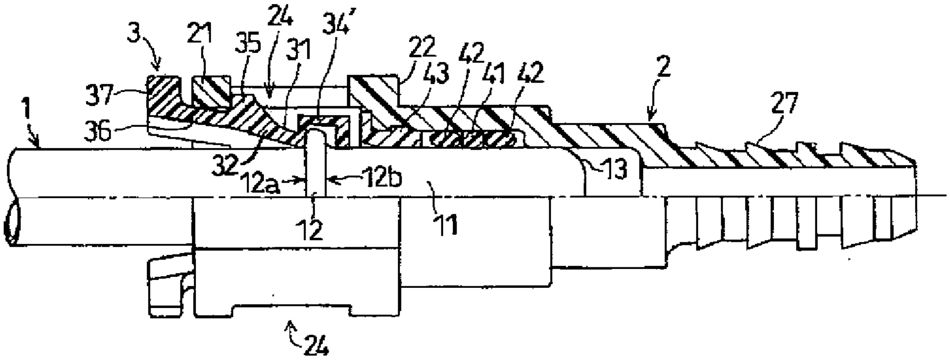
[Drawing 14]



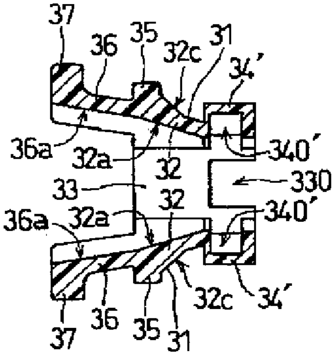
[Drawing 13]



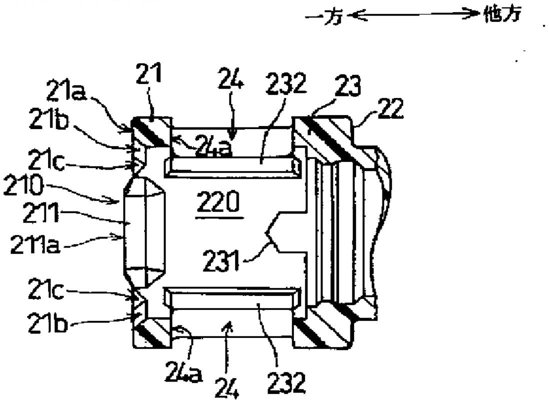
[Drawing 15]



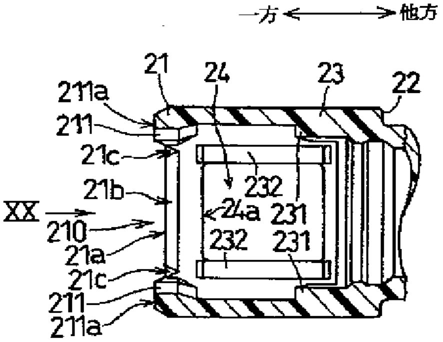
[Drawing 16]



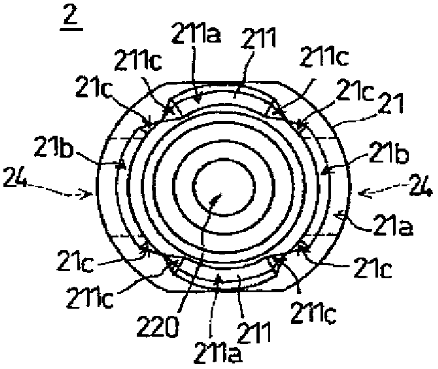
[Drawing 18]



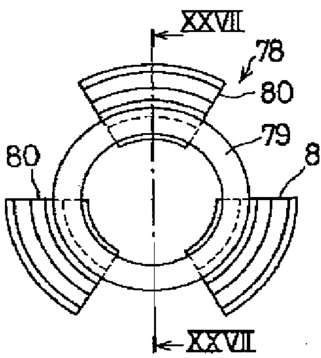
[Drawing 19]



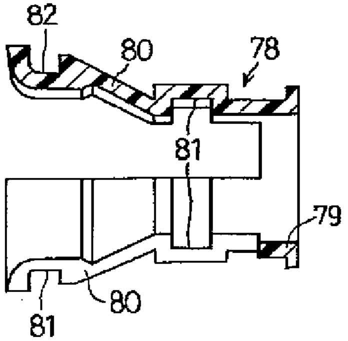
[Drawing 20]



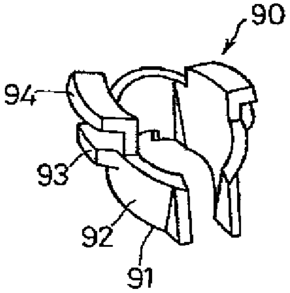
[Drawing 26]



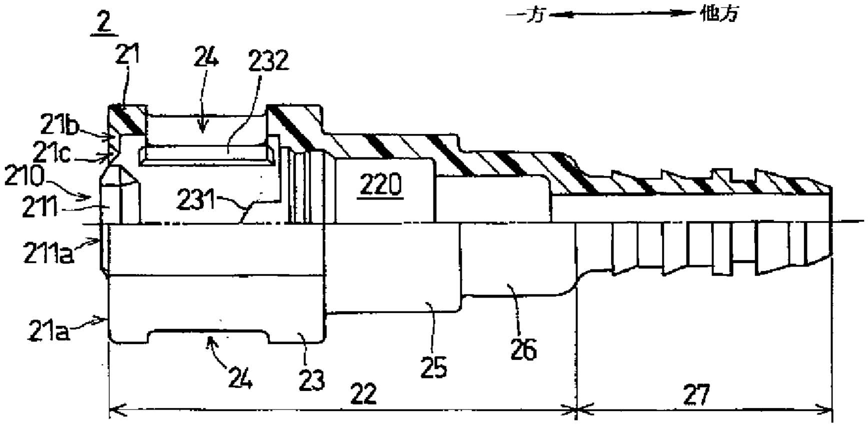
[Drawing 27]



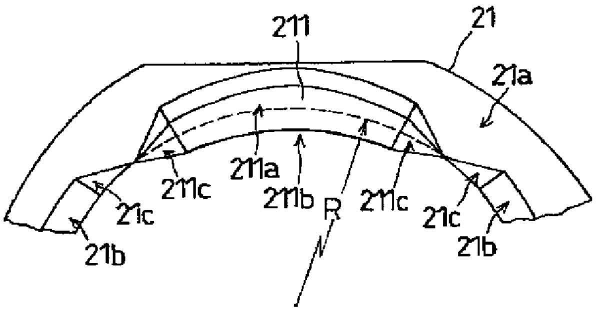
[Drawing 29]



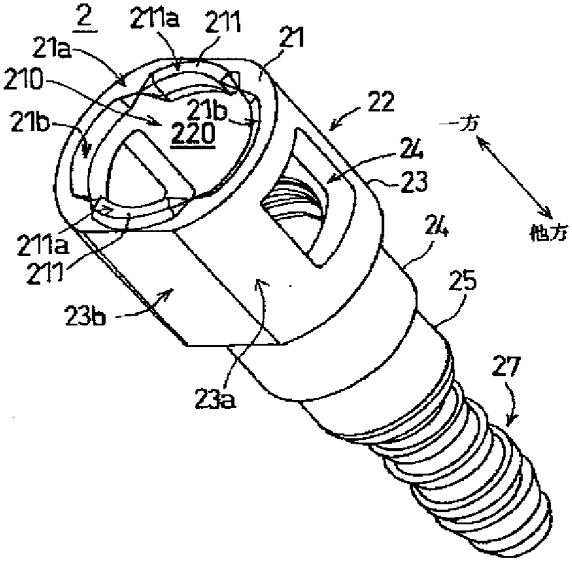
[Drawing 17]



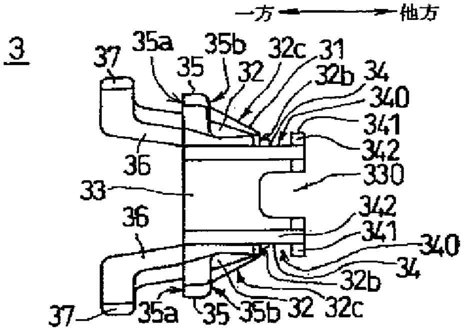
[Drawing 21]



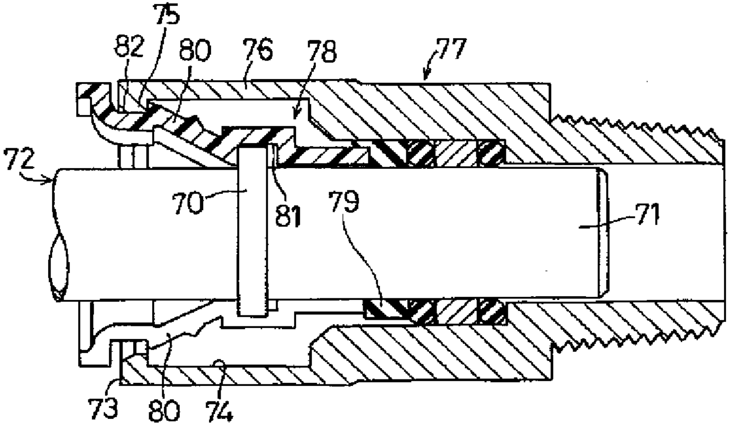
[Drawing 22]



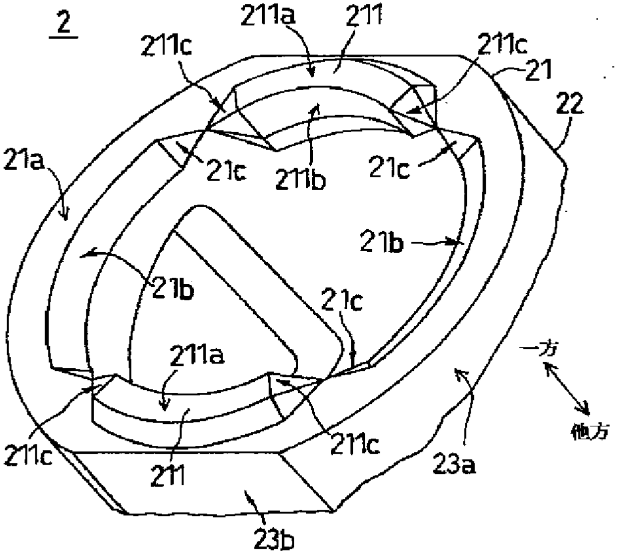
[Drawing 24]



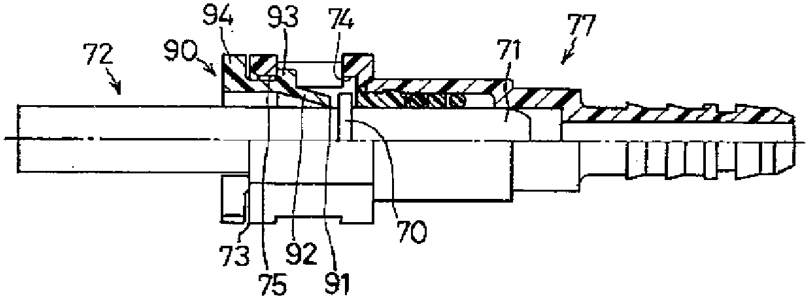
[Drawing 25]



[Drawing 23]



[Drawing 28]



[Translation done.]